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9/30/02

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10

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| **IN THE MATTER OF** | |
| **COMMENCEMENT BAY NEARSHORE/TIDEFLATS SUPERFUND SITE; THEA FOSS WATERWAY AND WHEELER OSGOOD WATERWAY** | EPA Docket No. CERCLA 10-2002-0153 |
| | **UNILATERAL ADMINISTRATIVE ORDER FOR REMEDIAL DESIGN AND REMEDIAL ACTION** |
| CITY OF TACOMA | |
| Respondent. | Proceeding Under Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, 42 U.S.C. § 9606(a) |

## TABLE OF CONTENTS

## TABLE OF CONTENTS continued.

## I. INTRODUCTION AND JURISDICTION

1. This Order directs Respondent to perform a remedial design for the activities contained in the Statement of Work which is a portion of the remedy described in the September 30, 1989 Record of Decision, as modified by the July 28, 1997 Explanation of Significant Differences, and the August 3, 2000 Explanation of Significant Differences for Commencement Bay Nearshore/Tideflats Superfund Site ("CB/NT Site") and to implement the design by performing a remedial action. This Order is issued to Respondent by the United States Environmental Protection Agency ("EPA") under the authority vested in the President of the United States by Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended ("CERCLA"), 42 U.S.C. 9606(a). This authority was delegated to the Administrator of EPA on January 23, 1987, by Executive Order 12580 (52 Fed. Reg. 2926, January 29, 1987), and was further delegated to EPA Regional Administrators on May 11, 1994, by EPA Delegation No. 14-14-B. The Regional Administrator of Region 10 delegated this authority to the Director of the Office of Environmental Cleanup on October 5, 1998 by Regional Delegation No. R10 14-14-B.

## II. FINDINGS OF FACT

2. The Thea Foss Waterway and Wheeler Osgood Waterway ("Site") are within the Commencement Bay Nearshore/Tideflats Superfund Site ("CB/NT Site"), and encompass approximately 118 acres in the two western-most waterways in Commencement Bay. The Thea Foss Waterway is bordered by Dock Street and Burlington Northern Railroad to the southwest and generally D Street to the east in Tacoma, Pierce County, Washington. The Wheeler Osgood Waterway is bordered by 11th Street to the North East, East 15th Street to the South and St. Paul Avenue to the East in Tacoma, Pierce County, Washington. The Waterways are depicted generally on the map attached to this

Order as Attachment 1. The Site, includes but is not limited to, the Mouth of Thea Foss Waterway Problem Area, the Head of Thea Foss Waterway Problem Area, the Wheeler Osgood Waterway Problem Area, and all other areas of the Thea Foss and Wheeler Osgood Waterways extending from minus 60 foot depth line in the bay to the head of the Thea Foss Waterway. The Work required under this Order addresses the specific activities set forth in the Statement of Work which is Attachment 2 to this Order at the locations depicted on the map which is Attachment 3 to this Order.

3. Respondent is the current and past owner and operator of facilities that have contributed hazardous substances to the Site. Respondent owns approximately 27 acres of property on, along and upland from the Thea Foss Waterway which have released or pose the potential threat of releasing hazardous substances to the Waterways. Respondent's property includes, but is not limited to, ownership of a portion of the Tacoma Coal Gasification site, the former Atlas Foundry site, the Pacific Coast Oil site, the City of Tacoma steam plant site, the Scofield site, and the North Pacific Plywood site. Contaminants in soils, groundwater, and sediments on these properties include organic and inorganic contaminants, which are contaminants found in the Site sediments, that are known or suspected to be toxic to humans and marine life and are designated as hazardous substances under Section 102(a) of CERCLA, 42 U.S.C. § 9602(a), as reported at 40 CFR Part 302.4. The hazardous substances from these properties were released or there is a potential threat of a release to the Site which pose a threat or potential threat to human health and the environment. Respondent operates and maintains the City of Tacoma storm drain system that discharges to the Waterways. City storm drain #254 discharges to the Wheeler Osgood Waterway and was determined by EPA and the Washington Department of Ecology ("Ecology") to be a major source of contamination to the Waterways. City storm drains #206, #207, #210, #215, #216, #217, #218, #219, #222, #223, #225, #226, #227, #230, #235, #237a, #237b, #238, #242, #243, #244, #245, #247, #248, #249, #250

and #251 discharge to the Thea Foss Waterway. City storm drains #230, #235, #237a, #237b, #245, and #248 were determined by EPA and Ecology to be major sources of contamination to the Thea Foss Waterway. Storm drains #237a and #237b drain approximately 5000 acres of uplands including the Nalley Valley and South Tacoma, respectively, and discharge to the Head of Thea Foss Waterway. #230 drains downtown Tacoma and discharges at S. 15th Street. Data from sediment catch basins and particulate measurements show elevated levels of contaminants in the storm drain discharges, including but not limited to zinc, low molecular weight aromatic hydrocarbons ("LPAH") and high molecular weight aromatic hydrocarbons ("HPAH"). Storm drain #235 drains downtown Tacoma and discharges into the west side of the waterway. Storm drains #245 and #248 drains along D Street into the Thea Foss Waterway.

4. Pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, EPA placed the CB/NT Site on the National Priorities List, set forth at 40 C.F.R. Part 300, Appendix B, by publication in the Federal Register on September 8, 1983, 48 Fed. Reg.40, 658. The CB/NT Site is located in Tacoma, Washington, at the southern end of the main basin of Puget Sound.

5. Because of the complexity of the CB/NT Site, Superfund response actions are currently coordinated under seven operable units managed primarily by EPA and Ecology, including (1) Operable Unit 01 - CB/NT Sediments; (2) Operable Unit 02 - Asarco Tacoma Smelter; (3) Operable Unit 03 - Tacoma Tar Pits; (4) Operable Unit 04 - Asarco Off-Property; (5) Operable Unit 05 - CB/NT Sources; (6) Operable Unit 06 - Asarco Sediments; and (7) Operable Unit 07 - Asarco Demolition. Operable Unit 01 addresses cleanup of 10-12 square miles of shallow water, shoreline, and aquatic lands located in the industrial tideflats area of the active commercial seaport of the City of Tacoma. This Order addresses Operable Unit 01, CB/NT Sediments, in portions of the Hylebos, Thea Foss and Wheeler Osgood Waterways.

6. In response to a release or a substantial threat of a release of hazardous substances at or from the CB/NT Site, EPA entered into a CERCLA Cooperative Agreement with the State of Washington, through the Department of Ecology ("Ecology") to conduct a Remedial Investigation and Feasibility Study ("RI/FS") for the Site pursuant to 40 C.F.R. § 300.430.

7. Ecology completed a Remedial Investigation ("RI") Report on contaminated sediments and sources and the results were published in August 1985. The results of the Feasibility Study ("FS") were published in February 1989. Pursuant to Section 117 of CERCLA, 42 U.S.C. § 9617, EPA published notice of the completion of the FS and of the proposed plan for remedial action on February 24, 1989, in a major local newspaper of general circulation. EPA provided an opportunity for written and oral comments from the public on the proposed plan for remedial action. A copy of the transcript of the public meeting is available to the public as part of the administrative record upon which the Regional Administrator based the selection of the response action.

8. The decision by EPA on the remedial action to be implemented at the CB/NT Site is contained in a final Record of Decision ("ROD"), executed on September 30, 1989. Both the State of Washington and Puyallup Tribe of Indians concurred on the Record of Decision. The ROD includes EPA's explanation for any significant differences between the final plan and the proposed plan as well as a responsiveness summary to the public comments. EPA has issued two Explanations of Significant Differences ("ESDs") to the CB/NT ROD that are relevant to this Order, one on July 28, 1997 and one on August 3, 2000. The State of Washington concurred on both ESDs. Public comment was taken on both ESDs and each ESD includes EPA's responsiveness summary to the public comments. The Record of Decision, 1997 ESD, and 2000 ESD are attached to this Order as Attachment 4 and are incorporated by reference. The Record of Decision and ESDs are each supported by an administrative record that

contains the documents and information upon which EPA based the selection of the response action.

9. The ROD selected the remedy for remediation of Operable Unit 01 sediments and sources of contamination (Operable Unit 05) in eight problem areas of the CB/NT Superfund Site, including the Head and Mouth of the Thea Foss Waterway and the Wheeler Osgood Waterway. There are five elements of the remedy for contaminated marine sediments: (1) Site use restrictions; (2) source control measures; (3) natural recovery; (4) active sediment remedial action; and (5) long-term source and sediment monitoring. The possible options for active sediment remedial action are one or more of the following four technologies: in-place capping, dredging and confined aquatic disposal, dredging and nearshore disposal, or dredging and upland disposal.

10. The RI/FS evaluated contaminants detected at the CB/NT Superfund Site to identify problem chemicals that pose the greatest risk to human health and the environment. The technical approach was to establish information relating specific chemicals to biological effects in various aquatic organisms and to quantifiable human health risks. Problem chemicals were defined as those chemicals whose concentration exceeded the low apparent effects threshold (AET) in a particular sediment problem area. The AET was defined as the contaminant concentration above which toxicity or benthic effects are always observed in a data set developed specifically for the Puget Sound using three biological effects tests: amphipod mortality, oyster larvae abnormality, and benthic infaunal depressions. Human health risks due to the ingestion of contaminated seafood were estimated using risk assessment methods and chemical concentrations detected in english sole muscle and liver tissue and crab muscle tissue.

11. Based on the RI/FS and the 1997 ESD, the current risks to public health are associated primarily with consumption of seafood organisms that have accumulated PCBs from contaminated sediment. The RI/FS concluded that the estimated

lifetime risks associated with consumption of 1 pound/month (15 grams/day) of Commencement Bay fish were $2 \times 10^{-4}$. In 1997, EPA updated the risk assessment assumptions for PCBs. Using revised assumptions regarding a tribal fishing and consumption scenario of 123 grams/day (approximately 20 meals per month), current estimated lifetime risks for human health increased to $9.8 \times 10^{-4}$ for the CB/NT Site. Contamination of CB/NT sediments by a wide variety of organic and inorganic chemicals has been shown to result in substantial adverse effects to biological resources by direct contact and ingestion. Sediment Quality Objectives (SQOs) were developed as the cleanup standards for the CB/NT Site based on the low AET values for chemicals other than PCBs, and based on the human health risk assessment for PCBs. Based on an evaluation of biological effects and human health risks during the RI/FS, the ROD established SQOs at the AET value for specific chemicals, as set forth in Table 5 of the ROD, Attachment 4.

12. After issuance of the Record of Decision and after a particular level of source control was achieved, EPA initiated remedial design studies on the Thea Foss and Wheeler Osgood Waterways in 1994. On March 23, 1994, Respondent entered into an Administrative Order on Consent ("AOC") with EPA for the preparation of, performance of, and reimbursement of oversight costs for Remedial Design Activities for the Thea Foss and Wheeler Osgood Waterways. The objectives of the AOC were: (1) to perform remedial design work for the Waterways consistent with the ROD; (2) to perform analyses and studies needed by EPA to select a Remediation Plan, including an acceptable confined disposal site and any necessary mitigation, which attains Sediment Quality Objectives identified in the ROD and all applicable or relevant and appropriate requirements; and (3) to provide for partial recovery by EPA of its response and oversight costs incurred with respect to the implementation of the Order.

13. Under the AOC, the Respondent collected physical, chemical, and biological samples to characterize the nature and extent of contamination, and to develop a

cleanup plan to address areas that exceed the SQOs. Respondent also evaluated potential for natural recovery and the potential for sediment recontamination after the cleanup. Additionally, the Respondent's studies inventoried and evaluated potential disposal sites for dredged contaminated sediment.

14. The data gathering and analysis conducted by the Respondent under the AOC resulted in the Round 3 Data Evaluation and Pre-Remedial Design Evaluation Report for the Thea Foss and Wheeler Osgood Waterways. After public comment, a remediation plan for the Thea Foss and Wheeler Osgood Waterways was approved in the August 3, 2000 ESD as the final remediation plan that was consistent with the ROD and ESDs.

15. As illustrated in Figures 2a and 2b in the August 2000 ESD, remedial action is required from station 1+00 to approximately station 70+20.

16. Hazardous substances detected in the Thea Foss and Wheeler Osgood Waterways during the RI/FS that significantly exceeded the SQO, include but are not limited to, polychlorinated biphenyls (PCBs), high molecular weight aromatic hydrocarbons (HPAH), cadmium, lead, zinc, and mercury, and were selected as chemical indicators of the most severe environmental contamination associated with biological effects and human health risks, and which are designated as hazardous substances under Section 102(a) of CERCLA, as reported at 40 CFR Part 302.4. The ROD established the SQOs at 17,000 ug/kg dry weight for HPAHs, 5.1 mg/kg dry weight for cadmium, 450 mg/kg dry weight for lead, 410 mg/kg dry weight for zinc, and .59 mg/kg dry weight for mercury. Pre-remedial design studies conducted after the RI/FS found that bis-2-ethyl hexylphthalate (BEP) was also widespread throughout the Thea Foss Waterway at significant levels associated with biological effects. The ROD, as confirmed by pre-design sampling, determined that natural recovery alone will not sufficiently reduce contaminant concentrations throughout the Head of the Thea Foss Waterway within the ten-year period,

so the ROD required the remedial design consider natural recovery and active sediment cleanup, using the four technology options specified in the ROD as components of the remedy. The ROD determined that natural recovery would eliminate the Mouth of the Thea Foss Waterway Problem Area within 10 years after completion of remedial action. However, pre-remedial design sampling found areas along the western bank of the Thea Foss Waterway and in the channel of the Waterway within the Mouth Problem Area that require active sediment cleanup. The ROD, confirmed by pre-design studies and sampling, also determined that natural recovery will not sufficiently reduce contaminant concentrations throughout the Wheeler Osgood Waterway within the ten-year period, so the ROD required the remedial design consider natural recovery and active sediment cleanup.

17. Data from the Thea Foss and Wheeler Osgood Waterways Pre-Remedial Design studies confirm that the hazardous substances detected in the Thea Foss and Wheeler Osgood Waterways during the RI/FS remain in the Waterways at concentrations that significantly exceed EPA's SQOs for the CB/NT Site. For example, from those chemicals listed in Paragraph 16, PCBs are present at concentrations up to 2140 parts per billion ("ug/kg" or "ppb") over 7.1 times the SQO specified in the ROD as amended in 1997. Total HPAH exceeds the SQO with a maximum concentration of 2,244,000 ppb, which is over 132 times the SQO. BEP exceeds the SQO with a maximum concentration of 16,003 ppb, which is 12.3 times the SQO. Zinc exceeds the SQO at a maximum concentration of 1583 parts per million ("mg/kg" or "ppm"), which is 3.86 times the SQO. Many other hazardous substances are commingled with the above-listed contaminants at levels that exceed the SQOs for those substances. Concentrations of hazardous substances in the Thea Foss and Wheeler Osgood Waterways also exceed the SQO in subsurface samples which will require areas of the waterway to be dredged to depths of up to thirty feet.

18. The contaminants are commingled in the Site. Numerous commercial and industrial activities have occurred along the Site over the past one hundred years. Facility operations along the Site, historically and currently, include, but are not limited to, a coal gasification plant, shipbuilding, dismantling and repair; bulk petroleum storage, railroad car storage and maintenance, wood products manufacturing, log sort yards, marinas and boat repair, and foundries. Fate and transport of hazardous substances released to the Site is affected by numerous forces, both natural and from anthropogenic waterway uses. Tidal currents and tidal flux (the upward/downward fluctuation of volume of water inside the waterway) are mechanisms for migration and movement of contamination within the Waterway. Ship traffic and ship scour are additional forces for disturbance of bottom sediments and resuspension of sediment for further migration from the original source of the release. Additionally, the Thea Foss Waterway was dredged several times in the early to mid-twentieth century, which also is a possible mechanism for redistribution of contaminated sediment.

19. There are numerous pathways for hazardous substances to be released into the Site from the facilities located adjacent to and in close proximity to the Site. Contaminated groundwater and direct wastewater discharges containing hazardous substances are pathways of migration to the Site. Contaminated soil on upland properties migrate to the Site through stormwater runoff. Additionally, historic landfilling and waste disposal practices directly or indirectly discharged and released hazardous substances to the Site.

20. The selected remedy for the CB/NT Site protects human health and the environment through source control measures that eliminate major sources of contaminants to the marine environment, especially in relation to bottom sediments. The remedy also provides for sediment confinement measures that isolate contaminated sediments from sensitive and edible marine resources. Sediment confinement options

selected in the 2000 ESD, include *in situ* capping, nearshore disposal, and upland disposal. The final Remediation Plan for the Thea Foss and Wheeler Osgood Waterways implements the ROD by identifying the areas in the Waterway that may naturally recover, and identifying the areas and volumes of sediment that must be dredged or capped, and selecting acceptable disposal sites.

21. Due to commingling of hazardous substances throughout the Site, liability for response costs is joint and several as among all identified potentially responsible parties. The harm to public health and the environment resulting from the release of hazardous substances to the Site is not divisible or apportionable.

22. This Order addresses specific remedial actions throughout the Site, but is not all of the remedial design and remedial action required to eliminate all threats to human health and the environment at the Site. The scope of work addressed in this Order and the selection of the Respondent to this Order represents EPA's determination of a practical and feasible scope of work for the 2002 and 2003 fall and winter work season. This determination was based on information provided to EPA by the Respondent. Respondent has developed the remedial design for a large portion of the Site. Because that level of work has occurred already, and because Respondent has shown they are capable of performing the work, this Order continues the progress made to date on the cleanup of the Site on the schedule contained in the attached Statement of Work.

## III. CONCLUSIONS OF LAW AND DETERMINATIONS

23. The Thea Foss and Wheeler Osgood Waterways Site is a "facility" as defined in Section 101(9) of CERCLA, 42 U.S.C. § 9601(9).

24. Each building, structure, pipe, pit, pond, impoundment, landfill, well, ditch, container, site or area where a hazardous substance has been deposited,

stored, disposed of, or placed, or otherwise come to be located which released or was a threat of a release of a hazardous substance to the Site is a "facility" as defined in Section 101(9) of CERCLA, 42 U.S.C. §9601(9).

25. Respondent is a "person" as defined in Section 101(21) of CERCLA, 42 U.S.C. § 9601(21).

26. Respondent is a "liable party" as defined in Section 107(a) of CERCLA, 42 U.S.C. § 9607(a), and is subject to this Order under Section 106(a) of CERCLA, 42 U.S.C. § 9606(a).

27. The substances listed in Paragraphs 16 and 17 are found at the Site and are "hazardous substances" as defined in Section 101(14) of CERCLA, 42 U.S.C. § 9601(14).

28. These hazardous substances have been, are being, and are threatened to be released from the Site into the surface water and marine sediments.

29. The past disposal and present migration of hazardous substances to and from the Site are a "release" as defined in Section 101(22) of CERCLA, 42 U.S.C. § 9601(22).

30. The potential for future migration of hazardous substances from the Site poses a threat of a "release" as defined in Section 101(22) of CERCLA, 42 U.S.C. § 9601(22).

31. The release and threat of release of one or more hazardous substances from the facility may present an imminent and substantial endangerment to the public health, welfare, or the environment.

32. The contamination and endangerment at this Site constitute an indivisible injury. The actions required by this Order are necessary to protect the public health, welfare, and the environment.

## IV. NOTICE TO THE STATE

33. On September 5, 2002, prior to issuing this Order, EPA notified the State of Washington, Department of Ecology, in writing, that EPA would be issuing this Order.

## V. ORDER

34. Based on the foregoing, Respondent is hereby ordered to comply with the following provisions, including, but not limited to, all attachments to this Order, all documents incorporated by reference into this Order, and all schedules and deadlines in this Order, attached to this Order, or incorporated by reference into this Order.

## VI. DEFINITIONS

35. Unless otherwise expressly provided herein, terms used in this Order which are defined in CERCLA or in regulations promulgated under CERCLA shall have the meaning assigned to them in the statute or its implementing regulations. Whenever terms listed below are used in this Order or in the documents attached to this Order or incorporated by reference into this Order, the following definitions shall apply:

A. "CERCLA" shall mean the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. § 9601, et seq.

B. "CB/NT Site" shall mean the Commencement Bay Nearshore/Tideflats Superfund Site, encompassing approximately 10-12 square miles of shorelines, intertidal areas, bottom sediments, water, and adjacent lands located in Tacoma, Washington. The upland boundaries of the CB/NT Site are defined according to the contours of localized drainage basins that flow into the marine waters. The marine

boundary of the CB/NT Site is limited to the shoreline, intertidal areas, bottom sediments, and water of depths less than 60 feet below mean lower low water. The nearshore portion of the CB/NT Site is defined as the area along the Ruston shoreline from the Mouth of Thea Foss Waterway to Point Defiance. The tideflats portion of the CB/NT Site includes the Hylebos, Blair, Sitcum, Milwaukee, St. Paul, Middle, Wheeler Osgood, and Thea Foss waterways; the Puyallup River upstream to the Interstate 5 bridge; and the adjacent land areas. The CB/NT Site encompasses the Thea Foss and Wheeler Osgood Waterways Site.

C. "Day" shall mean a calendar day unless expressly stated to be a working day. "Working day" shall mean a day other than a Saturday, Sunday, or Federal holiday. In computing any period of time under this Order, where the last day would fall on a Saturday, Sunday, or Federal holiday, the period shall run until the end of the next working day.

D. "EPA" shall mean the United States Environmental Protection Agency.

E. "Ecology" shall mean the Washington State Department of Ecology.

F. "Institutional Controls" or "site use restrictions" means land and/or water use restrictions which may include, but need not be limited to, restrictions in the form of contractual agreements, deed restrictions, state or local laws, regulations, ordinances or other governmental action.

G. "National Contingency Plan" or "NCP" shall mean the National Oil and Hazardous Substance Pollution Contingency Plan promulgated pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, codified at 40 C.F.R. Part 300, including any amendments thereto.

H. "Paragraph" shall mean a portion of this Order identified by an Arabic numeral.

I. "Performance Standards" shall mean the cleanup standards, standards of control, and other substantive requirements, criteria or limitations, including Sediment Quality Objectives, construction and post-construction standards, applicable and relevant and appropriate requirements, and habitat standards, set forth in the ROD, the 1997 ESD, the August 2000 ESD, the SOW, and approved work plans and reports under this Order.

J. "Record of Decision" or "ROD" shall mean the EPA Record of Decision relating to the CB/NT Site signed on September 30, 1989, by the Regional Administrator, EPA Region 10, all attachments thereto and all significant differences thereto documented in the ESD issued on July 28 , 1997 and the ESD issued on August 3, 2000. The ROD and the 1997 and 2000 ESDs are attached as Attachment 4. The July 1997 ESD or the August 2000 ESD may be referred to or discussed individually or separately from the 1989 ROD in this Order where appropriate.

K. "Remedial Action" or "RA" shall mean those activities, except for Operation and Maintenance, to be undertaken by Respondent to implement the final plans and specifications submitted by Respondent pursuant to the Remedial Design and Remedial Action Work Plans approved by EPA, including any additional activities required under Sections X, XI, XII, XIII, and XIV of this Order.

L. "Remedial Design" or "RD" shall mean those activities to be undertaken by Respondent to develop the final plans and specifications for the Remedial Action.

M. "Response Costs" shall mean all costs, including direct costs, indirect costs, and accrued interest incurred by the United States to perform or support response actions at the Site. Response costs include, but are not limited to, the costs of

overseeing the Work, such as the costs of reviewing or developing plans, reports, and other items pursuant to this Order and costs associated with verifying the Work.

N. "Site" shall mean the Thea Foss Waterway and the Wheeler Osgood Waterway, including but not limited to the Mouth of Thea Foss Waterway Problem Area, the Head of Thea Foss Waterway Problem Area, the Wheeler Osgood Waterway Problem Area, and all other areas of the Thea Foss Waterway extending from minus 60 foot depth line in the bay to the head of the Thea Foss Waterway. The Thea Foss and Wheeler Osgood Waterways encompass approximately 118 acres, and are the two western-most Waterways in Commencement Bay.

Q. "Statement of Work" or "SOW" shall mean the statement of work for implementation of the Remedial Design and Remedial Action for the Six Remedial Actions at the Site, as set forth in Attachment 2 to this Order. The Statement of Work is incorporated into this Order and is an enforceable part of this Order.

R. "Section" shall mean a portion of this Order identified by a Roman numeral and includes one or more paragraphs.

S. "State" shall mean the State of Washington.

T. "United States" shall mean the United States of America.

U. "Waste Material" shall mean (1) any "hazardous substance" under Section 101(14) of CERCLA, 42 U.S.C. § 9601(14); (2) any pollutant or contaminant under Section 101(33), 42 U.S.C. § 9601(33); (3) any "solid waste" under Section 1004(27) of RCRA, 42 U.S.C. § 6903(27); and (4) any "hazardous waste" under Washington's Model Toxics Control Act, Washington RCW 70.105D.

V. "Work" shall mean all activities Respondent is required to perform under this Order to implement the ROD in the Thea Foss and Wheeler Osgood Waterways, including Remedial Design and Remedial Action, and any activities required

to be undertaken pursuant to the SOW and Sections VII through XXIV, and XXVII of this Order.

## VII. NOTICE OF INTENT TO COMPLY

36. a. Respondent shall provide, not later than five (5) days after the effective date of this Order, written notice to EPA's Remedial Project Manager ("RPM") stating whether they will comply with the terms of this Order. If Respondent does not unequivocally commit to perform the RD and RA as provided by this Order, they shall be deemed to have violated this Order and to have failed to comply with this Order. Respondent's written notice shall describe, using facts that exist on or prior to the effective date of this Order, any "sufficient cause" defenses asserted by Respondent under Sections 106(b) and 107(c)(3) of CERCLA. The absence of a response by EPA to the notice required by this paragraph shall not be deemed to be acceptance of Respondent's assertions.

b. The Notice shall also contain the information required by Paragraphs 80 and 89 of this Order.

## VIII. PARTIES BOUND

37. This Order shall apply to and be binding upon Respondent, its employees, agents, successors, and assigns. No change in the ownership, status, or other control of any departments or functions of the government, shall alter any of the Respondent's responsibilities under this Order.

38. Respondent shall provide a copy of this Order to any prospective owners or successors before a controlling interest in Respondent's property rights are transferred to the prospective owner or successor. Respondent shall provide a copy of this Order to each contractor, subcontractor, laboratory, or consultant retained to perform

any Work under this Order, within five (5) days after the effective date of this Order or on the date such services are retained, whichever date occurs later. Respondent shall also provide a copy of this Order to each person representing Respondent with respect to the Site or the Work and shall condition all contracts and subcontracts entered into hereunder upon performance of the work in conformity with the terms of this Order. With regard to the activities undertaken pursuant to this Order, each contractor and subcontractor shall be deemed to be related by contract to the Respondent within the meaning of Section 107(b)(3) of CERCLA, 42 U.S.C. § 9607(b)(3). Notwithstanding the terms of any contract, Respondent is responsible for compliance with this Order and for ensuring that their contractors, subcontractors, and agents comply with this Order, and perform any Work in accordance with this Order.

39. Within forty-five (45) days after the effective date of this Order, if Respondent owns real property comprising all or a portion of any of the remedial action activity locations included in the SOW to this Order, Respondent shall record a copy or copies of this Order in the appropriate governmental office where land ownership and transfer records are filed or recorded, and shall ensure that the recording of this Order is indexed to the titles of each and every property at the Site so as to provide notice to third parties of the issuance and terms of this Order with respect to those properties. Respondent shall, within sixty (60) days after the effective date of this Order, send notice of such recording and indexing to EPA.

40. Not later than sixty (60) days prior to any transfer of any real property interest in any property included within the Site, Respondent shall submit a true and correct copy of the transfer documents to EPA, and shall identify the transferee by name, principal business address, and effective date of the transfer.

## IX. WORK TO BE PERFORMED

41. Respondent shall cooperate with EPA in providing information regarding the Work to the public. As requested by EPA, Respondent shall participate in the preparation of such information for distribution to the public and in public meetings which may be held or sponsored by EPA to explain activities at or relating to the Site.

42. Selection of Supervising Contractor.

a. All aspects of the Work to be performed by Respondent under this Order shall be under the direction and supervision of the Supervising Contractor, the selection of which shall be subject to disapproval by EPA. By October 29, 2002, Respondent shall notify EPA in writing of the name, title, and qualifications of any contractor proposed to be the Supervising Contractor. EPA will issue a notice of disapproval or an authorization to proceed. If at any time thereafter, Respondent proposes to change a Supervising Contractor, Respondent shall give such notice to EPA and must obtain an authorization to proceed from EPA before the new Supervising Contractor performs, directs, or supervises any Work under this Order.

b. EPA will either approve each proposed Supervising Contractor(s), accompanied by an authorization to proceed, or issue a notice of disapproval. If EPA disapproves a proposed Supervising Contractor(s), EPA will notify Respondent in writing. Within fourteen (14) days of EPA's disapproval of any proposed contractor, Respondent shall submit to EPA a list of contractors (which does not include the contractor(s) previously disapproved by EPA) that would be acceptable to them, including the qualifications of each contractor. EPA will provide written notice of the names of any contractor(s) that it disapproves and an authorization to proceed with respect to any of the other contractors. Respondent may select any contractor from those not disapproved and shall notify EPA of the name of the contractor selected within twenty-one (21) days of EPA's authorization to proceed. If at any time after EPA approves a Supervising Contractor, Respondent proposes to change that Supervising

Contractor, Respondent shall give such notice to EPA and must obtain an approval and an authorization to proceed from EPA before the new Supervising Contractor performs, directs, or supervises any Work under this Order.

c. With respect to any proposed Supervising Contractor, Respondent shall demonstrate that the proposed project manager has a quality system that complies with ANSI/ASQC E4-1994, "Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs" (American National Standard, January 5, 1995), by submitting a copy of the proposed project manager's Quality Management Plan (QMP). The QMP should be prepared in accordance with the specifications set forth in "EPA Requirements for Quality Management Plans (QA/R-2)" (EPA/240/B-01/002) or equivalent documentation as determined by EPA.

A. Remedial Design

43. Respondent shall submit the final design documents to supplement the draft 100% Design Analysis Report (City of Tacoma, dated April 25, 2002) for EPA review and approval in compliance with Sections IV and V of the SOW. Respondent shall perform all design phases described in Section IV of the SOW and on the schedule contained in Section V of the SOW.

44. Upon approval of the 2002 Activities Final Design documents by EPA, Respondent shall implement the remedial action according to the schedule in the SOW. Any violation of the approved remedial design shall be a violation of this Order. Unless otherwise directed by EPA, Respondent shall not perform further Work at the Site prior to EPA's written approval of the 2002 Activities Final Design.

B. Remedial Action

45. Respondent shall submit a 2002 Activities Remedial Action Work Plan ("RA Work Plan) to EPA for review and approval no later than December 3, 2002

in compliance with Section IV in the SOW. The 2002 Activities RA Work Plan shall be developed in accordance with the ROD and the July 1997 and August 2000 ESDs, the attached SOW, and shall be consistent with the 2002 Activities Final Design as approved by EPA. Respondent shall perform Remedial Action Construction as described in the SOW and in accordance with the approved 2002 Activities Final Design, and the approved 2002 Activities RA Work Plan, and on the schedule contained in Section V of the SOW.

46. Upon approval by EPA, the 2002 Activities RA Work Plan is incorporated into this Order as a requirement of this Order and shall be an enforceable part of this Order.

47. Upon approval of the 2002 Activities RA Work Plan by EPA, Respondent shall implement the 2002 Activities RA Work Plan according to the schedules in the Plan. Unless otherwise directed by EPA, Respondent shall not commence remedial action at the Site prior to approval of the 2002 Activities RA Work Plan.

48. Respondent shall submit a copy of the Remedial Action Construction Consultant Contractor solicitation documents to EPA not later than five (5) days after publishing the solicitation documents.

49. The Respondent shall notify EPA, in writing, of the name, title, and qualifications of the Remedial Action Construction Contractor proposed to be used in carrying out work under this Order by November 1, 2002. With respect to any proposed construction contractor, Respondent shall demonstrate that the proposed construction contractor has a quality system that complies with ANSI/ASQC E4-1994, "Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs" (American National Standard, January 5, 1995), by submitting a copy of the proposed project manager's QMP. The QMP should be

prepared in accordance with the specifications set forth in "EPA Requirements for Quality Management Plans (QA/R-2)" (EPA/240/B-01/002, March 2001) or equivalent documentation as determined by EPA. If, at any time, Respondent proposes to change the construction contractor, Respondent shall notify EPA and shall obtain approval from EPA as provided in this paragraph, before the new construction contractor performs any work under this Order. If EPA disapproves of the selection of any contractor as the construction management or construction contractor, Respondent shall submit a list of contractors that would be acceptable to them to EPA within ten (10) days after receipt of EPA's disapproval of the contractor previously selected.

50. The Work performed by Respondent pursuant to this Order shall, at a minimum, achieve the Performance Standards specified in the Record of Decision, 1997 and 2000 ESDs, the SOW, and approved Final Designs and final CQAP.

51. Notwithstanding any action by EPA, Respondent remains fully responsible for achievement of the Performance Standards for Work performed by Respondent pursuant to this Order. Nothing in this Order, or in EPA's approval of the SOW, or in the Remedial Design or Remedial Action Work Plans, or approval of any other submission, shall be deemed to constitute a warranty or representation of any kind by EPA that performance of the Remedial Design or Remedial Action will achieve the Performance Standards. Respondent's compliance with such approved documents does not foreclose EPA from seeking additional work to achieve the applicable Performance Standards.

52. Respondent shall, prior to any off-Site shipment of waste materials from the Site to an out-of-state waste management facility, provide written notification to the appropriate state environmental official in the receiving state and to EPA's RPM of such shipment of hazardous substances. However, the notification of shipments shall not

apply to any off-Site shipments when the total volume of all shipments from the Site to the state will not exceed ten (10) cubic yards.

a. The notification shall be in writing, and shall include the following information, where available: (1) the name and location of the facility to which the hazardous substances are to be shipped; (2) the type and quantity of the hazardous substances to be shipped; (3) the expected schedule for the shipment of the hazardous substances; and (4) the method of transportation. Respondent shall notify the receiving state of major changes in the shipment plan, such as a decision to ship the hazardous substances to another facility within the same state or to a facility in another state.

b. The identity of the receiving facility and state will be determined by Respondent following the award of the contract for Remedial Action construction. Respondent shall provide all relevant information, including information under the categories noted in Subaragraph 53.a above, on the off-Site shipments as soon as practicable after the award of the contract and before the hazardous substances are actually shipped.

53.a. Completion of the Remedial Action Construction Inspections and Report.

(1) Within five (5) days after Respondent makes preliminary determinations that construction is complete for each remedial action activity listed in the SOW, the Respondent shall notify EPA and the State for the purposes of conducting a prefinal inspection in compliance with Section IV of the SOW.

(2) Within ten (10) days after completion of any work identified in the prefinal inspection reports, the Respondent shall notify EPA and the State for purposes of conducting a final inspection of each remedial action activity listed in the SOW in compliance with Section IV of the SOW. The final inspection of all items identified in the pre-final inspection must be completed before February 15, 2003. Resolution of all

outstanding items must be documented in the Final Construction Report within thirty (30) days of the final inspection.

(3) Within thirty (30) days after construction is complete for all remedial action activities listed in the SOW, but before all the Performance Standards have been attained, Respondent shall submit a written Remedial Action Construction Report requesting certification to EPA. In the report, a registered professional engineer and the Respondent's Project Coordinator shall state that the Remedial Action construction has been completed for the remedial action activities required by the SOW in full satisfaction of the requirements of this Order. The Report shall comply with Section IV of the SOW. The report shall contain the following statement, signed by a responsible governmental official of Respondent or the Respondent's Project Coordinator:

> To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Respondent's certification to EPA shall not limit EPA's right to perform periodic reviews pursuant to Section 121(c) of CERCLA, 42 U.S.C. § 9621(c), or to take or require any action that in the judgment of EPA is appropriate at the Site, in accordance with 42 U.S.C. §§ 9604, 9606, or 9607. Certification of Completion of the Remedial Action construction shall not affect Respondent's obligations under this Order.

## X. FAILURE TO ATTAIN PERFORMANCE STANDARDS

54. In the event that EPA determines that additional response activities are necessary to meet applicable Performance Standards, EPA may notify Respondent that additional response actions are necessary.

55. Unless otherwise stated by EPA, within thirty (30) days of receipt of notice from EPA that additional response activities are necessary to meet any applicable Performance Standards, Respondent shall submit for approval by EPA a Work Plan for the additional response activities. The plan shall conform to the applicable requirements of Sections IX, XVI, and XVII of this Order. Upon EPA's approval of the plan pursuant to Section XIV, Respondent shall implement the plan for additional response activities in accordance with the provisions and schedule contained therein.

## XI. EPA PERIODIC REVIEW

56. Under Section 121(c) of CERCLA, 42 U.S.C. § 9621(c), and any applicable regulations, EPA may review the Site to assure that the Work performed pursuant to this Order adequately protects human health and the environment. Until such time as EPA certifies completion of the Work, Respondent shall conduct the requisite studies, investigations, or other response actions as determined necessary by EPA in order to permit EPA to conduct the review under Section 121(c) of CERCLA. As a result of any review performed under this paragraph, Respondent may be required to perform additional Work or to modify Work previously performed.

## XII. ADDITIONAL RESPONSE ACTIONS

57. EPA may determine that in addition to the Work identified in this Order and attachments to this Order, additional response activities may be necessary to protect human health and the environment. If EPA determines that additional response activities are necessary, EPA may require Respondent to submit a Work Plan for additional response activities. EPA may also require Respondent to modify any plan, design, or other deliverable required by this Order, including any approved modifications.

58. Not later than thirty (30) days after receiving EPA's notice that additional response activities are required pursuant to this Section, Respondent shall submit a Work Plan for the response activities to EPA for review and approval. Upon approval by EPA, the Work Plan is incorporated into this Order as a requirement of this Order and shall be an enforceable part of this Order. Upon approval of the Work Plan by EPA, Respondent shall implement the Work Plan according to the standards, specifications, and schedule in the approved Work Plan. Respondent shall notify EPA of their intent to perform such additional response activities within seven (7) days after receipt of EPA's request for additional response activities.

## XIII. ENDANGERMENT AND EMERGENCY RESPONSE

59.a. In the event of any action or occurrence during the performance of the Work which causes or threatens to cause a release of a hazardous substance or which may present an immediate threat to public health or welfare or the environment, Respondent shall immediately take all appropriate action to prevent, abate, or minimize the threat. Respondent shall, within 24 hours of the onset of such action or occurrence, orally notify the EPA Project Coordinator or, in the event that the EPA Project Coordinator is unavailable, the Emergency Response Section, Region 10, United States Environmental Protection Agency at (206) 553-1263. These reporting requirements are in addition to the reporting required by CERCLA Section 103 or Section 304 of the Emergency Planning and Community Right-to-Know Act (EPCRA).

b. Respondent shall take such action in consultation with EPA's RPM and in accordance with all applicable provisions of this Order, including, but not limited to, the Health and Safety Plan and the Contingency Plan.

c. Within seven (7) days of the onset of such an event, Respondent shall furnish to EPA and the State a written report, signed by the

Respondent's Project Coordinator, setting forth the events which occurred and the measures taken, and to be taken, in response thereto. Within 30 days of the conclusion of such an event, Respondent shall submit a report setting forth all actions taken in response thereto.

60. In the event that Respondent fails to take appropriate response action as required by this Section, and EPA takes that action instead, Respondent shall reimburse EPA for all costs of the response action not inconsistent with the NCP. Respondent shall pay the response costs in the manner described in Section XXIV of this Order, within thirty (30) days of Respondent's receipt of demand for payment and a Superfund Cost Recovery Package Imaging and Online System (SCORPIOS) report, which includes all direct and indirect costs incurred by EPA.

61. Nothing in the preceding paragraph shall be deemed to limit any authority of the United States to take, direct, or order all appropriate action to protect human health and the environment or to prevent, abate, or minimize an actual or threatened release of hazardous substances on, at, or from the Site.

## XIV. EPA REVIEW OF SUBMISSIONS

62. After review of any deliverable, plan, report, or other item (including agreed upon partial submissions) which is required to be submitted for review and approval pursuant to this Order, EPA may: (a) approve the submission; (b) approve the submission with modifications; (c) disapprove the submission and direct Respondent to resubmit the document after incorporating EPA's comments; or (d) disapprove the submission and assume responsibility for performing all or any part of the response action. As used in this Order, the terms "approval by EPA", "EPA approval", or a similar term means the action described in (a) or (b) of this paragraph.

63. In the event of approval or approval with modifications by EPA, Respondent shall proceed to take any action required by the plan, report, or other item, as approved or modified by EPA.

64. Upon receipt of a notice of disapproval or a request for a modification, Respondent shall, within twenty-one (21) days or such longer time as specified by EPA in its notice of disapproval or request for modification, correct the deficiencies and resubmit the plan, report, or other item for approval. Notwithstanding the notice of disapproval, or approval with modifications, Respondent shall proceed, at the direction of EPA, to take any action required by any non-deficient portion of the submission.

65. If any submission is not approved by EPA, Respondent shall be deemed to be in violation of this Order.

## XV. REPORTING REQUIREMENTS

66.a. In addition to any other deliverables and reporting requirements in this Order, Respondent shall submit to EPA and the State written weekly progress reports that: (a) describe the actions which have been taken toward achieving compliance with this Order during the previous week; (b) include a summary of all results of sampling and tests and all other data received or generated by Respondent or their contractors or agents in the previous week; (c) identify all work plans, plans and other deliverables required by this Order completed and submitted during the previous week; (d) describe all actions, including, but not limited to, data collection and implementation of work plans, which are scheduled for the next six weeks and provide other information relating to the progress of construction, including, but not limited to, critical path diagrams, Gantt charts and Pert charts; (e) include information regarding percentage of completion, unresolved delays encountered or anticipated that may affect the future

schedule for implementation of the Work, and a description of efforts made to mitigate those delays or anticipated delays; (f) include any modifications to the work plans or other schedules that Respondent has proposed to EPA or that have been approved by EPA; and (g) describe all activities undertaken in support of the Community Relations Plan during the previous week and those to be undertaken in the next two weeks. Respondent shall submit these progress reports to EPA and the State by Wednesday of each week following the lodging of this Order until EPA notifies the Respondent that EPA approves a different schedule for submission of progress reports. If requested by EPA, Respondent shall also provide briefings for EPA to discuss the progress of the Work.

b. The Respondent shall notify EPA of any change in the schedule described in the weekly progress report for the performance of any activity, including, but not limited to, data collection and implementation of work plans, no later than three days prior to the performance of the activity.

67.a. Respondent shall submit four (4) copies of all plans, reports, and data required by the SOW or this Order, or any other approved plans to EPA in accordance with the schedules set forth in such plans. Respondent shall simultaneously submit one (1) copy of all such plans, reports and data to the State and one (1) copy to NOAA on behalf of the Natural Resource Trustees at the addresses set forth below. Respondent shall send one copy to EPA electronically first and follow by placing three copies in regular mail.

As to EPA:

Piper Peterson Lee
Regional Project Manager
U.S. Environmental Protection Agency
Region 10
1200 6th Ave., ECL-111
Seattle, WA 98101

As to the State of Washington:

Russ McMillan
State Project Coordinator
Site Cleanup Section
Toxics Cleanup Program
Department of Ecology
P.O. Box 47775
Olympia, WA 98504-7600

As to the Natural Resource Trustees:

Robert Taylor
Office of General Counsel
Damage and Restoration Center, N.W.
National Oceanagraphic and Atmospheric Administration
U.S. Department of Commerce
7600 Sand Point Way, N.E.
BIN C15700
Seattle, Washington 98115

c. All required written communications other than work plans, design documents, and technical reports shall also be sent by regular mail to the following:

Lori Houck Cora
Office of Regional Counsel
U.S. Environmental Protection Agency
Region 10
1200 6th Ave., ORC-158
Seattle, WA 98101

68. All reports and other documents submitted by Respondent to EPA (other than the weekly progress reports referred to above) which purport to document Respondent's compliance with the terms of this Order shall be signed by an authorized representative of the Respondent.

## XVI. QUALITY ASSURANCE, SAMPLING, AND DATA ANALYSIS

69. Respondent shall use quality assurance, quality control, and chain-of-custody procedures for all samples taken under the SOW and this Order in

accordance with "EPA Requirements for Quality Assurance Project Plans (QA/R5)" (EPA/240/B-01/003, March 2001), "Guidance for Quality Assurance Project Plans (QA/G-5)" (EPA/600/R-98/018, February 1998), and any amendments to these documents, while conducting all sample collection and analysis activities required herein by any plan. Prior to the commencement of any monitoring project under this Order, Respondent shall submit to EPA for approval a Quality Assurance Project Plan ("QAPP") that is consistent with the SOW, the NCP and applicable guidance documents. Respondent shall ensure that such laboratories shall analyze all samples submitted by EPA pursuant to the QAPP for quality assurance monitoring. To provide quality assurance and maintain quality control, Respondent shall:

a. Use laboratories that have a documented Quality System which complies with ANSI/ASQC E4-1994, "Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs" (American National Standard, January 5, 1995) and "EPA Requirements for Quality Management Plans (QA/R-2)" (EPA/240/B-01/002, March 2001) or equivalent documentation as determined by EPA. EPA may consider laboratories accredited under the National Environmental Laboratory Accreditation Program (NELAP) as meeting the Quality System requirements. Respondent shall ensure that all field methodologies utilized in collecting samples for subsequent analysis pursuant to this Order will be conducted in accordance with the procedures set forth in the QAPP approved by EPA.

b. Ensure that all contracts with laboratories used by Respondent for the analysis of samples taken pursuant to this Order provide access to EPA personnel and EPA-authorized representatives; and

c. Ensure that the laboratories utilized by Respondent for the analysis of samples taken pursuant to this Order perform all analyses according to accepted EPA methods. Accepted EPA methods consist of those methods which are documented in the

"Contract Lab Program Statement of Work for Inorganic Analysis" (Revision No. 11, 1992) and the "Contract Lab Program Statement of Work for Organic Analysis" (Revision 9, 1994), and any amendments thereto (including amendments made during the course of the implementation of this Order).

70. Upon request, the Respondent shall allow split or duplicate samples to be taken by EPA or its authorized representatives. Respondent shall notify EPA not less than fourteen (14) days in advance of any sample collection activity unless shorter notice is agreed to by EPA. In addition, EPA shall have the right to take any additional samples that EPA deems necessary.

71. In accordance with Section XV of this Order, Respondent shall submit to EPA copies of the results of all sampling and/or tests or other data obtained or generated by or on behalf of Respondent with respect to the Thea Foss and Wheeler Osgood Waterway Site and/or the implementation of this Order.

72. Nothing in this Order shall be deemed to affect the United States' information gathering and inspection authorities and rights, including enforcement actions related thereto, under CERCLA, RCRA and any other applicable statutes or regulations.

## XVII. COMPLIANCE WITH APPLICABLE LAWS

73. All activities by Respondent pursuant to this Order shall be performed in accordance with the requirements of all Federal and state laws and regulations. EPA has determined that the activities contemplated by this Order are consistent with the NCP.

74. Except as provided in Section 121(e) of CERCLA and the NCP, no permit shall be required for any portion of the Work conducted entirely on-Site.

75. Where any portion of the Work requires a federal or state permit or approval, Respondent shall submit timely applications and take all other actions necessary to obtain and to comply with all such permits or approvals.

76. This Order is not, and shall not be construed to be, a permit issued pursuant to any federal or state statute or regulation.

## XVIII. REMEDIAL PROJECT MANAGER

77. All communications, whether written or oral, from Respondent to EPA shall be directed to EPA's Remedial Project Manager:

Piper Peterson Lee
EPA Project Coordinator
United States Environmental Protection Agency
Region 10, ECL - 111
1200 Sixth Avenue
Seattle, Washington 98101

peterson-lee.piper@epa.gov

78. EPA has the unreviewable right to change its Remedial Project Manager. If EPA changes its Remedial Project Manager, EPA will inform Respondent, in writing, of the name, address, and telephone number of the new Remedial Project Manager.

79. EPA's RPM shall have the authority lawfully vested in a Remedial Project Manager ("RPM") and On-Scene Coordinator ("OSC") by the NCP, 40 C.F.R. Part 300. EPA's RPM or Alternate RPM shall have authority, consistent with the NCP, to halt any work required by this Order, and to take any necessary response action.

80. Within five (5) days after the effective date of this Order, Respondent shall designate its Project Coordinator, along with its Notice of Intent to Comply with this Order, and shall submit the name, address, e-mail address, and telephone number of the Project Coordinator to EPA for review and approval. Respondent's Project Coordinator shall be responsible for overseeing Respondent's

implementation of this Order. If Respondent wishes to change his/her Project Coordinator, Respondent shall provide written notice to EPA, five (5) days prior to changing the Project Coordinator, of the name and qualifications of the new Project Coordinator. Respondent's selection of a Project Coordinator shall be subject to EPA approval.

## XIX. SITE ACCESS AND INSTITUTIONAL CONTROLS

81. If the Site, or any other property where access and/or land/water use restrictions are needed to implement this Order and any other order or agreement for remedial action issued and/or entered into by EPA, is owned or controlled by the Respondent, Respondent shall:

a. commencing on the effective date of this Order, provide EPA, the State, and their representatives, including their contractors, with access at all reasonable times to the Site, or such other property, for the purpose of conducting any activity related to this Order, including the following activities:

(i) Monitoring the Work;

(ii) Verifying any data or information submitted to EPA;

(iii) Conducting investigations relating to contamination at or near the Site;

(iv) Obtaining samples;

(v) Assessing the need for, planning, or implementing additional response actions at or near the Site;

(vi) Implementing any Work;

(vii) Inspecting and copying records, operating logs, contracts, or other documents maintained or generated by Respondent

or its agents, consistent with Section XXI (Record Preservation);

(viii) Assessing Respondent's compliance with this Order; and

(ix) Determining whether the Site or other property is being used in a manner that is prohibited or restricted, or that may need to be prohibited or restricted, by or pursuant to this Order or any other order or agreement issued and/or entered into by EPA related to the Site;

(x) Assessing implementation of quality assurance and quality control practices as defined in the approved Quality Assurance Project Plans.

b. commencing on the effective date of this Order, refrain from using the Site, or such other property, in any manner that would interfere with or adversely affect the integrity or protectiveness of the remedial measures to be implemented pursuant to this Order, so as to achieve the following institutional control objectives:

(i) reduce potential exposure of marine organisms to contaminated sediments disposed of and confined in aquatic disposal sites or confined by capping;

(ii) reduce potential exposure to marine organisms to contaminated sediments left in place in the Thea Foss and Wheeler Osgood Waterway; and

c. within forty-five (45) days of EPA's request, execute and record in the Recorder's Office or Registry of Deeds or other appropriate office of Pierce County, State of Washington, a restrictive covenant running with land authorized by the Washington Model Toxics Control Act (MTCA) and that complies with the form and

content contained in WAC 173-340-440 that (i) grants a right of access for the purpose of conducting any activity related to this Order or any other order or agreement issued and/or entered into by EPA related to the Site, including, but not limited to, those activities listed in subparagraph a. of this Paragraph, and (ii) grants the right to enforce any land/water use restrictions mandated under subparagraph b. of this Paragraph, or other restrictions that EPA determines are necessary to implement, ensure non-interference with, or ensure the protectiveness of the remedial measures to be performed pursuant to this Order or any other order or agreement issued and/or entered by EPA related to the Site. Respondent shall grant the access rights and the rights to enforce the land/water use restrictions to one or more of the following persons, as determined by EPA: (i) EPA and its representatives, (ii) the State and its representatives, and/or (iii) other appropriate grantees.

82. If the Site, or any other property where access and/or water use restrictions are needed to implement this Order, is owned or controlled by persons other than Respondent, Respondent shall use best efforts to secure from such persons within thirty (30) days from the effective date of this Order:

a. an agreement to provide access thereto for Respondent, EPA, the State, as well as their respective representatives (including contractors), for the purpose of conducting any activity related to this Order, including those activities listed in Paragraph 83.a. of this Order;

b. an agreement, enforceable by Respondent and EPA, to abide by the obligations and restrictions, or that are otherwise necessary to implement, ensure non-interference with, or ensure the protectiveness of the remedial measures to be performed pursuant to Paragraphs 83.b. and c. of this Order; and

c. within forty-five (45) days of a request from EPA, the execution and recordation in the Recorder's Office or other appropriate land records

office of Pierce County, State of Washington, a restrictive covenant running with land authorized by the Washington Model Toxics Control Act (MTCA) and that complies with the form and content contained in WAC 173-340-440 that (i) grants a right of access for the purpose of conducting any activity related to this Order or any other order or agreement issued and/or entered into by EPA related to the Site, including, but not limited to, those activities listed in subparagraph a. of this Paragraph, and (ii) grants the right to enforce any land/water use restrictions mandated under subparagraph b. of this Paragraph, or other restrictions that EPA determines are necessary to implement, ensure non-interference with, or ensure the protectiveness of the remedial measures to be performed pursuant to this Order or any other order or agreement issued and/or entered by EPA related to the Site. Respondent shall grant the access rights and the rights to enforce the land/water use restrictions to one or more of the following persons, as determined by EPA: (i) EPA and its representatives, (ii) the State and its representatives, and/or (iii) other appropriate grantees.

d. for purposes of this Paragraph, "best efforts" includes the payment of reasonable sums of money in consideration of access, access easements, land/water use restrictions, and/or restrictive easements. If any access or land/water use restriction agreements required by subparagraphs a. or b. of this Paragraph are not obtained within thirty (30) days of the effective date of this Order, or any restrictive easements required by subparagraph c. of this Paragraph are not submitted to EPA in draft form within forty-five (45) days of the date of EPA's request therefor, Respondent shall promptly notify EPA in writing, and shall include in that notification a summary of the steps that Respondent has taken to attempt to comply with this Paragraph. EPA may, as it deems appropriate, assist Respondent in obtaining access or land/water use restrictions, either in the form of contractual agreements or in the form of easements running with the land.

e. If EPA determines that land and/or water use restrictions in the form of state or local laws, regulations or ordinances are needed to implement the remedy selected in the ROD, ensure the overall integrity and protectiveness thereof, or ensure non-interference therewith, Respondent shall cooperate with EPA's efforts to secure such governmental controls.

## XX. DATA/DOCUMENT AVAILABILITY

83. Owner Respondent shall allow EPA and its authorized representatives and contractors to enter and freely move about all property at the Site and off-Site areas subject to or affected by the work under this Order or affected by work under another Order or agreement with EPA. Respondent shall allow EPA and its authorized representatives and contractors to enter and freely move about all property where documents required to be prepared or maintained by this Order are located, for the purposes of inspecting conditions, activities, the results of activities, records, operating logs, and contracts related to the Site. Respondent shall allow EPA and its authorized representatives and contractors to enter and freely move about all property at the Site and off-Site areas subject to or affected by the work under this Order for reviewing the progress of the Respondent in carrying out the terms of this Order; conducting tests as EPA or its authorized representatives or contractors deem necessary; using a camera, sound recording device, or other documentary-type equipment; and verifying the data submitted to EPA by Respondent. Respondent shall allow EPA and its authorized representatives to enter the Site, to inspect and copy all records, files, photographs, documents, sampling and monitoring data, and other writings related to work undertaken in carrying out this Order. Nothing herein shall be interpreted as limiting or affecting EPA's right of entry or inspection authority under federal law.

84. Respondent may assert a claim of business confidentiality covering part or all of the information submitted to EPA pursuant to the terms of this Order under 40 C.F.R. § 2.203, provided such claim is not inconsistent with Section 104(e)(7) of CERCLA, 42 U.S.C. § 9604(e)(7), or other provisions of the law. This claim shall be asserted in the manner described by 40 C.F.R. § 2.203(b) and substantiated by Respondent at the time the claim is made. Information determined to be confidential by EPA will be given the protection specified in 40 C.F.R. Part 2. If no such claim accompanies the information when it is submitted to EPA, it may be made available to the public by EPA or the state without further notice to the Respondent. Respondent shall not assert confidentiality claims with respect to any data related to Site conditions, sampling, or monitoring.

85. Respondent shall maintain for the period during which this Order is in effect, an index of documents that Respondent claims contain confidential business information. The index shall contain, for each document, the date, author, addressee, and subject of the document. Upon written request from EPA, Respondent shall submit a copy of the index to EPA.

## XXI. RECORD PRESERVATION

86. Respondent shall provide to EPA, upon request, copies of all documents, electronic files, and information within their possession and/or control or that of their contractors or agents relating to activities at the Site or to the implementation of this Order, including, but not limited to, sampling, analysis, chain-of-custody records, manifests, trucking logs, receipts, reports, sample traffic routing, correspondence, or other documents, electronic files, or information related to the Work. Respondent shall also make available to EPA for purposes of investigation, information gathering, or testimony,

their employees, agents, or representatives with knowledge of relevant facts concerning the performance of the Work.

87. Until ten (10) years after Respondent's receipt of EPA's certification of Remedial Action Completion under Paragraph 55, each Settling Defendant shall preserve and retain and shall instruct their contracting agents to preserve and retain all records and documents now in its possession or control or which come into its possession or control that relate in any manner to the performance of the Work or liability of any person for response actions conducted and to be conducted at the Thea Foss and Wheeler Osgood Waterway Site, regardless of any corporate retention policy to the contrary. Until 10 years after the Respondent's receipt of EPA's certification of Remedial Action Completion under Paragraph 55, Settling Defendants shall also instruct their contractors and agents to preserve all documents, records, and information of whatever kind, nature or description relating to the performance of the Work.

88. At the conclusion of this document retention period, Respondent shall notify the United States at least ninety (90) days prior to the destruction of any such records or documents, including electronic files of deliverables and data, and, upon request by the United States, Respondent shall deliver any such records, documents, or electronic files to EPA.

89. Within five (5) days after the effective date of this Order, along with its Notice of Intent to Comply with this Order, Respondent shall submit a written certification to EPA's RPM that they have not altered, mutilated, discarded, destroyed, or otherwise disposed of any records, documents, electronic files, or other information relating to their potential liability with regard to the Site since notification of potential liability by the United States or the state, or the filing of suit against it regarding the Site. Respondent shall not dispose of any such documents without prior approval by EPA.

Respondent shall, upon EPA's request and at no costs to EPA, deliver the documents or copies of the documents to EPA.

## XXII. DELAY IN PERFORMANCE

90. Any delay in performance of this Order that, in EPA's judgment, is not properly justified by Respondent under the terms of this paragraph shall be considered a violation of this Order. Any delay in performance of this Order shall not affect Respondent obligations to fully perform all obligations under the terms and conditions of this Order.

91. Respondent shall notify EPA of any delay or anticipated delay in performing any requirement of this Order. Such notification shall be made by telephone to EPA's RPM or Alternate RPM within forty-eight (48) hours after Respondent first knew or should have known that a delay might occur. Respondent shall adopt all reasonable measures to avoid or minimize any such delay. Within five (5) business days after notifying EPA by telephone, Respondent shall provide written notification fully describing the nature of the delay, any justification for delay, any reason why Respondent should not be held strictly accountable for failing to comply with any relevant requirements of this Order, the measures planned and taken to minimize the delay, and a schedule for implementing the measures that will be taken to mitigate the effect of the delay. Increased costs or expenses associated with implementation of the activities called for in this Order is not a justification for any delay in performance.

## XXIII. ASSURANCE OF ABILITY TO COMPLETE WORK

92. Respondent shall demonstrate their ability to complete the Work required by this order and to pay all claims that arise from the performance of the Work

by obtaining and presenting to EPA within thirty (30) days after the approval of the RD Work Plan one of the following :

a. A surety bond guaranteeing performance of the Work;

b. One or more irrevocable letters of credit equaling the total estimated cost of the Work;

c. A trust fund;

d. A guarantee to perform the Work by one or more parent corporations or subsidiaries, or by one or more unrelated corporations that have a substantial business relationship with at least one of the Respondent; or

e. A demonstration that the Respondent satisfies the requirements of 40 C.F.R. Part 264.143(f). For these purposes, references in 40 CFR 264.143 (f) to the "sum of current closure and post-closure costs estimates and the current plugging and abandonment costs estimates" shall mean the amount of financial security specified above. If the Respondent seeks to provide a demonstration under 40 CFR 264.143(f) and have provided a similar demonstration at other RCRA or CERCLA sites, the amount for which they were providing financial assurance at those other sites should generally be added to the estimated costs of the Work from this paragraph. Respondent shall demonstrate financial assurance in an amount no less than the estimate of costs for the remedial design and remedial action contained in the August 2000 ESD for the Site. If Respondent seeks to demonstrate ability to complete the remedial action by means of internal financial information, or by guaranty of a third party, they shall resubmit such information annually, on the anniversary of the effective date of this Order. If EPA determines that such financial information is inadequate, Respondent shall, within thirty (30) days after receipt of EPA's notice of determination, obtain and present to EPA for approval one of the other three (3) forms of financial assurance listed above.

93. At least seven (7) days prior to commencing any work at the Site pursuant to this Order, Respondent shall submit to EPA a certification that Respondent or its contractors and subcontractors have adequate insurance coverage or have indemnification for liabilities for injuries or damages to persons or property which may result from the activities to be conducted by or on behalf of Respondent pursuant to this Order. Respondent shall ensure that such insurance or indemnification is maintained for the duration of the Work required by this Order.

## XXIV. REIMBURSEMENT OF RESPONSE COSTS

94. Respondent shall reimburse EPA, upon written demand, for all response costs incurred by the United States in overseeing Respondent's implementation of the requirements of this Order or in performing any response action which Respondent fails to perform in compliance with this Order. EPA may submit to Respondent on a periodic basis an accounting of all response costs incurred by the United States with respect to this order. EPA's certified Agency Financial Management System summary data (SCORPIOS reports), or such other summary as certified by EPA, shall serve as the basis for payment demands.

95. Respondent shall, within thirty (30) days of receipt of each EPA accounting, remit a certified or cashier's check for the amount of those costs. Interest shall accrue from the later of the date that payment of a specified amount is demanded in writing or the date of the expenditure. The interest rate is the rate established by the Department of the Treasury pursuant to 31 U.S.C. § 3717 and 4 C.F.R. § 102.13.

96. Checks shall be by a certified or cashier's check or checks made payable to "EPA Hazardous Substance Superfund," referencing the name of the Site, EPA Site/Spill Identification Number 10-AC, and the title of this Order. Settling Defendants shall send the check(s) to:

Mellon Bank
EPA-Region 10
Attn: Superfund Accounting
P.O. Box 360903M
Pittsburgh, PA 15251

97. Respondent shall send copies of each transmittal letter and check to EPA's RPM.

## XXV. UNITED STATES NOT LIABLE

98. The United States, by issuance of this Order, assumes no liability for any injuries or damages to persons or property resulting from acts or omissions by Respondent, or its employees, agents, representatives, successors, assigns, contractors, or consultants in carrying out any action or activity pursuant to this Order. Neither EPA nor the United States may be deemed to be a party to any contract entered into by Respondent or its employees, agents, successors, assigns, contractors, or consultants in carrying out any action or activity pursuant to this Order.

## XXVI. ENFORCEMENT AND RESERVATIONS

99. EPA reserves the right to bring an action against Respondent under Section 107 of CERCLA, 42 U.S.C. § 9607, for recovery of any response costs incurred by the United States related to this Order and not reimbursed by Respondent. This reservation shall include, but not be limited to, past costs, direct costs, indirect costs, the costs of oversight, the costs of compiling the cost documentation to support oversight cost demand, as well as accrued interest as provided in Section 107(a) of CERCLA.

100. Notwithstanding any other provision of this Order, at any time during the response action, EPA may perform its own studies, complete the response action (or any portion of the response action) as provided in CERCLA and the NCP, and seek reimbursement from Respondent for its costs, or seek any other appropriate relief.

101. Nothing in this Order shall preclude EPA from taking any additional enforcement actions, including modification of this Order or issuance of additional Orders, and/or additional remedial or removal actions as EPA may deem necessary, or from requiring Respondent in the future to perform additional activities pursuant to Section 106(a) of CERCLA, 42 U.S.C. § 9606(a), et seq., or any other applicable law. Respondent shall be liable under Section 107(a) of CERCLA, 42 U.S.C. § 9607(a), for the costs of any such additional actions.

102. Notwithstanding any provision of this Order, the United States hereby retains all of its information gathering, inspection, and enforcement authorities and rights under CERCLA, RCRA, and any other applicable statutes or regulations.

103. Respondent shall be subject to civil penalties under Section 106(b) of CERCLA, 42 U.S.C. 9606(b), of not more than $ 27,500.00 for each day in which Respondent willfully violates, or fails or refuses to comply with this Order without sufficient cause. In addition, failure to properly provide response action under this Order, or any portion hereof, without sufficient cause, may result in liability under Section 107(c)(3) of CERCLA, 42 U.S.C. § 9607(c)(3), for punitive damages in an amount at least equal to, and not more than, three (3) times the amount of any costs incurred by the Fund as a result of such failure to take proper action.

104. Nothing in this Order shall constitute or be construed as a release from any claim, cause of action, or demand in law or equity against any person for any liability it may have arising out of, or relating in any way to, the Site.

105. If a court issues an order that invalidates any provision of this Order or finds that Respondent has sufficient cause not to comply with one or more provisions of this Order, Respondent shall remain bound to comply with all provisions of this Order not invalidated by the Court's order.

## XXVII. ADMINISTRATIVE RECORD

106. Upon request by EPA, Respondent must submit to EPA all documents related to the selection of the response action for possible inclusion in the administrative record file.

## XXVIII. EFFECTIVE DATE AND COMPUTATION OF TIME

107. This Order shall be effective the day it is signed by the Director, Environmental Cleanup Office. All times for performance of ordered activities shall be calculated from this effective date.

## XXIX. OPPORTUNITY TO CONFER

108. EPA and Respondent have conferred on several occasions on the Order and the SOW prior to its issuance.

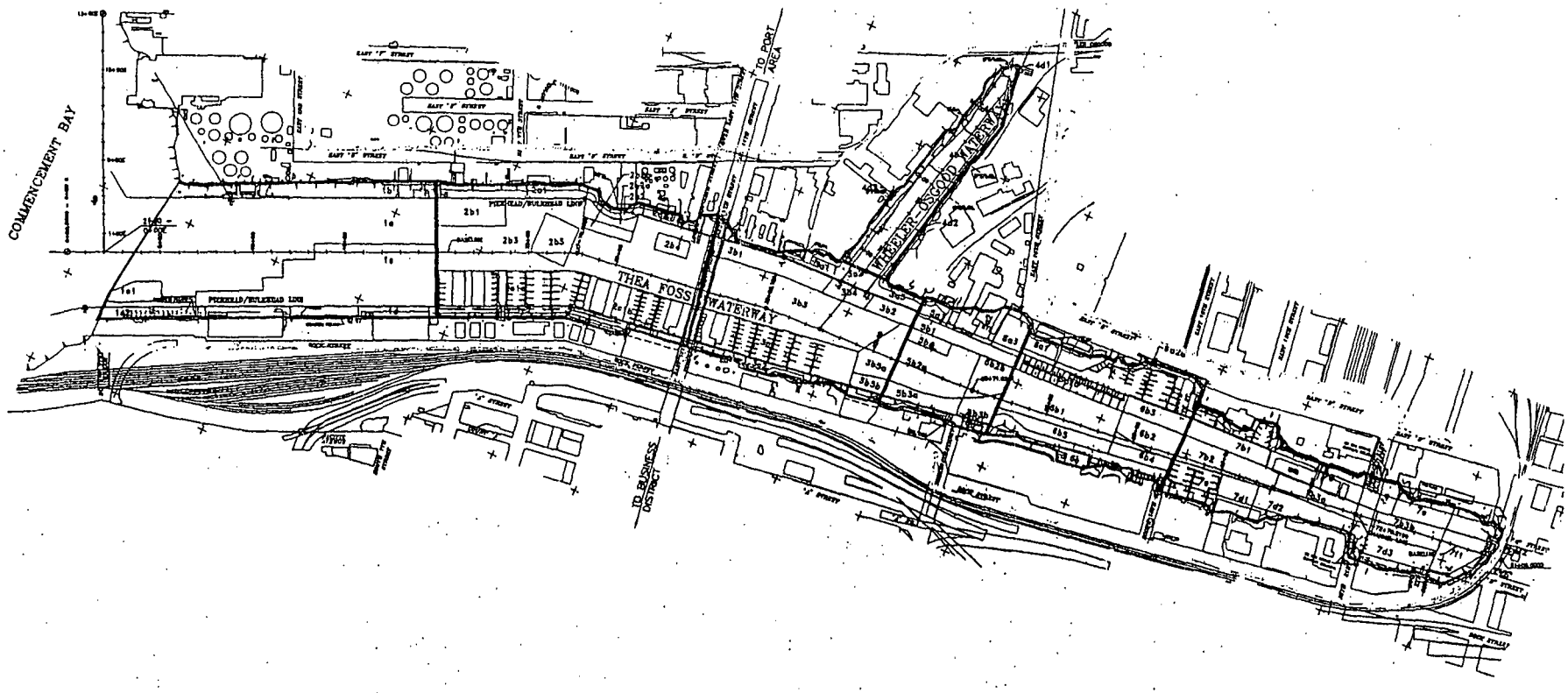
So Ordered, this 30 day of September, 2002.

By: _____
Michael F. Gearheard, Director
Environmental Cleanup Office
U.S. Environmental Protection Agency

TACIII

To the Unilateral Administrative Order fo
Remedial Design and Remedial Action of th
2002 Activities

# Thea Foss and Wheeler-Osgood Waterways




HARTCROW

# STATEMENT OF WORK
# 2002 REMEDIAL ACTION UNDER UNILATERAL ADMINISTRATIVE ORDER

## THEA FOSS AND WHEELER OSGOOD WATERWAYS
## COMMENCEMENT BAY NEARSHORE/TIDEFLATS SUPERFUND SITE
## TACOMA, WASHINGTON

## I. PURPOSE

The purpose of this Statement of Work (SOW) is to set forth requirements for implementation of portions of the remedial action (RA) at the three Thea Foss and Wheeler Osgood Waterway problem areas[1] set forth in the Record of Decision (ROD), which was signed by the Regional Administrator of the United States Environmental Protection Agency (U.S. EPA), Region 10 on September 30, 1989, for the Commencement Bay Nearshore/Tideflats (CB/NT) Superfund Site (the CB/NT Site), and the Explanation of Significant Difference (ESD) dated July 28, 1997, and a separate ESD dated August 3, 2000. The August 2000 ESD specifies the cleanup plan, performance criteria and the disposal sites for the Thea Foss and Wheeler Osgood Waterways, among other areas. The 1997 ESD modified the sediment cleanup standard for polychlorinated biphenyls (PCBs). This SOW defines portions of the Remedial Design (RD) and RA ("2002 Remedial Actions") to be completed before February 15, 2003. Specifically, these six actions are: capping in RAs 1A and 1B – Mouth of Thea Foss, RA 3 – Totem Marine Services and RAs 10, 11 and 13 – Wheeler Osgood Waterway, construction in RA 14 – Martinac Ship Building, installation of a sheet pile bulkhead in RA 8 – Johnny's Seafood, and timber pile removal in state-owned aquatic land on the Middle/St. Paul peninsula.

In conducting work specified in this SOW, the Respondent shall follow: the 1989 ROD as modified by the 1997 and 2000 ESDs; approved pre-remedial design deliverables; approved remedial design documents; this SOW; the approved Remedial Action Work Plan; and, U.S. EPA Superfund Remedial Design and Remedial Action Guidance and any additional guidance developed by the U.S. EPA in submitting deliverables for implementing the remedial action at the Thea Foss and Wheeler Osgood Waterway problem areas of the CB/NT Site. Implementation of this SOW shall result in achieving the CB/NT Site cleanup objectives including the Sediment Quality Objectives in portions of the Thea Foss and Wheeler Osgood Waterways.

Finalizing the remedial design for the six cleanup elements and implementing the remedial action for the 2002 actions cleanup is being completed under an Unilateral Administrative Order (UAO) (September 2002). This SOW addresses the implementation of the approved 2002 final remedial design documents (i.e., "2002 Final Design" which includes the design analysis reports, Construction Quality Assurance Plan, Permitting and Site Access Plan, and the Remedial Action Work Plan for specific areas of the Thea Foss and the Wheeler Osgood Waterways.

The overall design for the cleanup of the remainder of the Thea Foss and Wheeler Osgood Waterways, is being conducted under an Administrative Order on Consent (AOC, March 1994). The remedial action for these activities will be implemented under the proposed Remedial Action Consent Decree/Statement of Work, or a subsequent Order.

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[1] The Head of Thea Foss with the exception of Remedial Areas 23 and 24, as defined in the draft final design documents, the Mouth of Thea Foss and the Wheeler Osgood Waterways.

## II. DESCRIPTION OF REMEDIAL ACTION

- **Key Elements of CB/NT ROD**

The CB/NT ROD selected a remedy comprised of five (5) key elements: site use restrictions (now commonly referred to as institutional controls), source control, natural recovery, sediment remedial action (i.e., confinement and habitat restoration), and monitoring, to address contaminated sediments in the waterways of the CB/NT site.

One of the elements of the CB/NT ROD will be implemented under this SOW: sediment remedial action (including capping actions defined in the Final Design and a habitat restoration activity, as defined in the Final Design). The remaining elements of the CB/NT ROD will be implemented under the proposed Remedial Action Consent Decree/SOW, or subsequent Order, which governs the remedial action at the portions of the three Thea Foss and Wheeler Osgood problem areas not covered by this SOW.

The ROD recognized that the sources of contamination throughout the CB/NT Superfund site would have to be controlled before sediment cleanup could be achieved. The cleanup strategy for CB/NT has been to eliminate or reduce ongoing sources of problem chemicals to the extent practicable before implementing in-water cleanup actions. In 1989, EPA and the Washington Department of Ecology (Ecology) entered into an agreement that identified the Ecology Commencement Bay Urban Action Team (UBAT) as lead for implementing source control actions. The administrative mechanism used by Ecology to inform EPA of its progress on source control is a series of reports called Milestone Reports issued for each problem area identified in the ROD. To date, Ecology has completed all of the Milestone reports (i.e., 1-5) for the mouth of the Thea Foss Waterway and the Wheeler Osgood Waterway. Milestones 1 and 2 have been completed for the head of Thea Foss Waterway. Milestone 3–Essential remedial action implemented for major sources, Milestone 4–Administrative actions in place for all confirmed sources and Milestone 5–Remedial action implemented for all sources are outstanding for the head of Thea Foss. EPA has determined that adequate source controls are in place to proceed with the remedial action at the site.

Ecology is working with various parties to complete source control actions in upland areas adjacent to the head of the Thea Foss Waterway, specifically the area near the west bank non-aqueous phase liquid (NAPL) seep. This work is being done under the Washington State Model Toxics Control Act (MTCA) and the Clean Water Act.

Remedial Design and Remedial Action for RAs 23 and 24 in the head of the Thea Foss Waterway will be performed by Puget Sound Energy, Advance Ross Sub Company, and PacifiCorps (Utilities) under a separate proposed Consent Decree, or Order, with EPA. The Respondent shall coordinate remedial action efforts with Utilities performing work in RAs 23 and 24 to ensure overall consistency and completeness of the project.

- **Cleanup Objectives**

The cleanup objectives for the remedial action, as described in Section 10 of the 1989 ROD, state that "the selected remedy is to achieve acceptable sediment quality in a

reasonable time frame" (CB/NT ROD, p. 97). Habitat function and enhancement of fisheries resources are also project cleanup objectives.

### 1. Acceptable Sediment Quality in a Reasonable Time Frame

"Acceptable sediment quality" is defined as "the absence of acute or chronic adverse effects on biological resources or significant human health risk" (CB/NT ROD, p.62). The ROD designated biological test requirements and associated sediment chemical concentrations referred to as sediment quality objectives (SQOs) to attain cleanup objectives for the CB/NT site. The PCB SQO was subsequently updated in a 1997 ESD.

Sediment quality objectives are performance standards for the CB/NT site. Sediment quality objectives for individual chemical contaminants that are specified in the ROD, as amended in the 1997 ESD, are provided in Table 1 to this SOW. The SQOs are the enforceable cleanup standards for this SOW. In addition to the SQOs, Respondent may elect, with EPA approval, to perform biological toxicity tests for all chemicals except PCBs to demonstrate the absence of biological effects predicted by the SQOs. Toxicity testing may also be used to assess the suitability of sediments for open-water disposal when chemical data predict that biological effects might be present. Relevant biological test criteria are provided in Table 2 to this SOW.

A "reasonable time frame" incorporates the ROD's selection of natural recovery for sediments in the CB/NT site that are minimally contaminated and are predicted to naturally recover within 10 years from implementation of the remedial action in any given problem area. Modeling and analysis conducted during pre-remedial design and early design of the Thea Foss and Wheeler Osgood Waterway problem areas identified natural recovery areas. Performance monitoring of natural recovery areas is included in the Operations, Maintenance and Monitoring Plan under the proposed Remedial Action Consent Decree/ SOW, or subsequent Order. In all other areas in the Thea Foss and Wheeler Osgood Waterway problem areas addressed by the proposed Remedial Action Consent Decree, or subsequent Order, where SQOs are exceeded and are not predicted to recover within 10 years, active remediation by dredging and confined disposal and/or in-situ capping is required. The time frame for achieving the SQOs in such areas shall be at the end of construction of the remedial action.

### 2. Habitat Function and Enhancement of Fisheries Resources

Habitat function and enhancement of fisheries resources have also been incorporated as part of the overall project cleanup objectives and remedial design. For example, the physical characteristics and placement of material used for capping contaminated sediments in the marine environment will be required to provide a suitable substrate and habitat for aquatic organisms that may utilize that environment. The scope and focus of these activities is outlined in the final design documents. Consideration of habitat function and enhancement of fisheries resources is required under this SOW to meet cleanup objectives and comply with ARARs, including the Clean Water Act, Endangered Species Act, and the Puyallup Tribe of Indians Settlement Act of 1989.

- **Thea Foss and Wheeler Osgood Waterway 2002 Action Areas Covered Under The Unilateral Administrative Order**

The locations of the 2002 remedial action areas covered under this SOW are shown in Figure 2.

The Final Design Analysis Report describes the design approach and remedial actions to be implemented in each Remedial Action Area based upon EPA's selected remedy for the waterway as described in the August 2000 ESD. The Respondent will prepare a Remedial Action Work Plan (RAWP) that defines the activities covered by this SOW. A general description of the remedial action work required in the 2002 action areas included under the Unilateral Administrative Order is provided below.

### 1. Capping in RA 1A and 1B

A thick cap, as per the requirements in the ROD and ESD, will be placed at RA 1A and 1B located on the west side of the mouth of the waterway between Stations 1+00 and 7+00 (Figure 2), to isolate contaminated sediments. RA 1A covers a small channel area at an elevation of approximately -30 feet MLLW and RA 1B covers the adjacent slope on the west side of the waterway.

Based on the design, approximately 3,400 cubic yards (cy) of sand are required for capping RA 1A and approximately 8,300 and 8,600 cy of filter material and riprap, respectively, are required for capping RA 1B. In addition, 470 tons of habitat mix are estimated to cover the interstices of the slope cap for RA 1B. Some of the capping material may be dredged from the Mouth of the Thea Foss Waterway if approved by EPA.

### 2. Capping in RA 3 - Totem Marine Services

A thick cap, as per the requirements in the ROD and ESD, will be placed over the majority of RA 3, the slope of the marina facility at Totem Marine Services at the east end of the waterway between Stations 27+50 and 31+00 (Figure 2), to isolate contaminated sediments as part of the overall remedy of the waterway.

The estimated volume of materials for RA 3 is unknown at this time. The slope at RA3 is a slag deposit and severely over steepened. In order to obviate conflicts with marina operations, the design of the slope at RA 3 will include Articulating Block Mat and Uniform Standard Mat to cap this slope that will be both protective and compatible with the current boat lift operations.

### 3. Capping in RAs 10, 11, and 13 - Wheeler-Osgood Waterway

A thick slope cap, as per the requirements in the ROD and ESD, will be placed at RAs 10, 11, and 13 in the Wheeler-Osgood Waterway to isolate contaminated sediments and to rehabilitate the slope that will be both protective and compatible with habitat goals.

### 4. Construction in RA 14 - Martinac Ship Building

An underpier cap will be placed at RA 14, the Martinac Ship Building Facility between Stations 48+00 and 51+00 (Figure 2), above elevation 2 feet MLLW to isolate contaminated sediments. Removal of slag/debris piles is also required.

Based on the design, approximately 2,000 cy of quarry spalls will be placed under the wharf structures. Work on the lower slope (dredging and capping the slope below elevation 0 feet MLLW) will be performed as part of the overall waterway cleanup under the proposed Remedial Action Consent Decree/SOW, or subsequent Order.

### 5. Timber Pile Removal in State-Owned Aquatic Land on the Middle/St. Paul Peninsula

Timber piles located on State-owned aquatic land within the Middle/St. Paul Peninsula will be removed and taken for upland disposal or recycling. Removed timbers would be removed to an upland location and classified for appropriate disposition.

Based on the design approximately 1,300 timber piles are located on the Middle/St. Paul Peninsula. More than half of these are located on state-owned aquatic lands between the inner and outer harbor lines.

### 6. Installation of Sheet Pile Bulkhead in RA 8 - Johnny's Seafood

A sheet pile bulkhead will be installed along the bank by Johnny's Seafood (Stations 47+00 to 52+00) to support slope design for RA 8 and the dredge prism in RA 6. Based on the design, approximately 400 linear feet of sheet pile would be installed.

## III. PERFORMANCE STANDARDS

The Respondent shall adhere to the following performance standards for the design and implementation of the Thea Foss and Wheeler Osgood Waterways RD/RA. These performance standards, as stated in the 2000 ESD, are consistent with the cleanup objectives and are necessary to ensure that the remedy is protective of human health and the environment, and complies with Applicable or Relevant and Appropriate Requirements (ARARs). Performance standards shall include cleanup standards, standards of control, quality criteria, and other substantive requirements, criteria, or limitations including all ARARs set forth in the ROD, ESDs, SOW, and approved deliverables under this SOW. The Respondent shall address these performance standards in remedial design and shall identify additional performance standards and methods necessary to successfully implement the remedial action. Monitoring the long-term effectiveness of these actions will occur in conjunction with the Operations, Maintenance and Monitoring Plan (OMMP) requirements for the remedial action of the entire Thea Foss and Wheeler Osgood Waterways, with the exception of RAs 23 and 24.

- **Cap Requirements**

Respondent shall demonstrate that all capped areas are completed in accordance with the performance standards identified in the 2002 Final Design and RAWP. The methods for achieving the performance standards for the capped areas will be set forth in the 2002 Final Design and RAWP. EPA intends to maintain the integrity and effectiveness of any capped area over contaminated sediments through requirements for construction, long-term monitoring, and maintenance. Verification of performance standards shall be documented as outlined in the Construction Quality Assurance Plan (CQAP). As-builts shall

be provided for each element of the 2002 actions in the Remedial Action Construction Report.

- **Habitat Mitigation**

Under this SOW, habitat mitigation is not necessary at this time. However, habitat mitigation requirements for these actions will be taken into consideration in the approved Final Design for the Thea Foss and Wheeler Osgood Waterways remediation actions, and may be required at a later time.

## IV. WORK TO BE PERFORMED BY RESPONDENT

In 1994, the City of Tacoma undertook remedial design activities for the Thea Foss and Wheeler Osgood Waterways under an Administrative Order on Consent (AOC, March 1994). Under the AOC, the City conducted sampling and analysis to further refine the areal extent of contamination in the Waterways and conducted analysis for determining where natural recovery was feasible, what areas needed to be dredged, what areas could be capped, and where the dredged sediment could be disposed. Based on the City's work, EPA selected the final remediation plan in the August 2000 ESD. In accordance with the AOC, the Draft Final Design Analysis Report (e.g., 100% design) was submitted to EPA on April 25, 2002. Under the proposed Remedial Action Consent Decree/SOW, or subsequent Order, the City will finalize the remedial design process which will result in a 100% Final Design Analysis Report as per the requirements of the AOC and ESD (2000) and in response to EPA's comments. Under the proposed Remedial Action Consent Decree/SOW, or subsequent Order, the Respondent shall conduct long-term monitoring and maintenance as outlined in the approved Final Design and source control activities as identified in the Stormwater Work Plan Addendum.

This SOW requires the Respondent to finalize the 2002 remedial action design documentation and to conduct 2002 remedial action in the areas identified in Section II D. Under this SOW, the Respondent shall complete the construction of the 2002 remedial actions as prescribed in the UAO and detailed in the RAWP.

Implementation of the remedial action plan under this Statement of Work includes the following key components:

- Revise and complete the design for the 2002 actions;
- Implement the 2002 remedial actions in the Thea Foss and Wheeler Osgood Waterways, including capping, timber piling removal and disposal, and slope stabilization actions;
- Handle/transport/place/recycle removed timber pilings in an approved upland location;
- Perform construction monitoring;
- Coordinate with Utilities and property owners as necessary; and

- Documentation and reporting during and after the remedial action elements

To accomplish this scope of work the remedial action shall consist of the following four (4) activities (A through D). Respondent shall be responsible for implementing additional work elements necessary for successful implementation of the Thea Foss and Wheeler Osgood Waterways remedial action. All plans are subject to EPA approval.

A. Final Design for 2002 Actions
B. Remedial Action Work Plan
C. Remedial Action/Construction
    1. Preconstruction Inspection/Meeting
    2. RA Progress Meetings
    3. Pre-final Construction Inspection
    4. Final Construction Inspection
    5. Remedial Action Construction Report

D. Performance Monitoring and Construction Quality Assurance Plan

Additional details on each task are provided below. All documents, including work plans, reports, and memoranda, required under this SOW are subject to EPA review and approval. Unless otherwise specified by EPA, a draft version of each document shall be submitted to EPA for review and comment. Unless specified by EPA, within ten (10) calendar days of receipt of EPA's comments on a draft document, the Respondent shall submit to EPA a revised final document that incorporates EPA's modifications or summarizes and addresses EPA's concerns. All deliverables submitted in response to EPA's comments shall include a transmittal that responds directly to each comment, and identifies how the comment was addressed in the deliverable. This SOW also specifies submittal of certain documentation (e.g., construction progress reports, weekly progress reports) that will be used by EPA for informational purposes only but will not be formally approved by EPA.

## A. Final Design for 2002 Actions

The remedial design is generally defined as those activities to be undertaken to develop the final plans and specifications, general provisions, special requirements, and all other technical and procurement documentation necessary to fully implement the remedial action at this Site as described in the CB/NT ROD and this SOW. Respondent shall prepare construction plans and specifications to implement the remedial actions at the Site in these six locations as described in the ROD, ESD and this SOW. Plans and specifications shall be submitted in accordance with the schedule set forth in Section V below. Subject to approval by U.S. EPA, Respondent may submit more than one set of design submittals reflecting different components of the remedial action. All remedial design work, including plans and specifications, shall be developed in accordance with U.S. EPA's Superfund Remedial Design and Remedial Action Guidance (OSWER Directive No. 9355.0-4A) and shall demonstrate that the remedial action shall meet all objectives of the ROD, ESD, CD, and this SOW, including all performance standards. Respondent shall meet weekly with U.S. EPA to discuss design issues, unless a less frequent schedule is agreed to by EPA.

## B. Remedial Action Work Plan

The Respondent shall submit a Remedial Action Work Plan (RAWP) in accordance with Section IX of the UAO and Section V of this SOW which includes a detailed description of the remediation and construction activities, including how those construction activities are to be implemented by Respondent and coordinated with EPA (e.g., site-monitoring, material staging and handling). When describing implementation of the remedial action, Respondent shall identify discrete elements of the remedial action for purposes of monitoring construction activities as they occur. The RAWP shall include a project schedule for each major activity and submission of deliverables generated during the remedial action.

The RAWP will contain the following elements to be approved by EPA:

- A narrative description of the methods to be employed in the remedial action including equipment types, modes of operation, schedules, sequence of activities, and other aspects necessary to fully describe the work;
- A Quality Assurance Plan based on requirements set forth in the design documents;
- A Health & Safety Plan based on the requirements set forth in the design documents;
- An Environmental Protection Plan including the following sub-elements:
  - Water Quality Monitoring (FSP/QAPP);
  - Sediment Verification Sampling (FSP/QAPP);
- A plan for coordinating the 2002 action work relative to the overall RA work in the Thea Foss and Wheeler Osgood Waterways. This plan should identify any potential issues of concern and planned solutions for tying the 2002 actions into the overall remedial action.

Note that the listing above is not exhaustive and the design documents may call for additional plan elements or other plans not listed. In case of any conflict, the list here shall be viewed as a minimum requirement.

## C. Remedial Action Construction

The Respondent shall implement the remedial action as detailed in the approved Final Design and Final Remedial Action Work Plan. The following activities shall be completed in constructing the remedial action.

### 1. Pre-Construction Inspection and Meeting

The Respondent shall participate with U.S. EPA and the State in a pre-construction inspection and meeting to:

a. Review methods for documenting and reporting inspection data, and compliance with specifications and plans including methods for processing design changes and securing EPA review and approval of such changes as necessary;

b. Review methods for distributing and storing documents and reports;

c. Review work area security and safety protocol;

d. Demonstrate the construction management is in place, and discuss any appropriate modifications of the construction quality assurance plan to ensure that Site-specific considerations are addressed; and

e. Conduct a Site walk-about/boat tour to verify that the design criteria, plans, and specifications are understood and to review material and equipment storage locations.

All inspections and meetings shall be documented by a Settling Defendant's designated contact and minutes shall be transmitted to all parties within seven (7) working days of the inspection or meeting.

**2. RA Progress Meetings**

Respondent shall conduct RA progress meetings on a regular basis throughout the RA. The meetings shall be held twice per month unless a less frequent schedule is agreed to by EPA. At a minimum, Respondent shall address the following at progress meetings:

a. General progress of construction with respect to RA schedule;

b. Problems encountered and associated action items;

c. Pending design, personnel or schedule changes requiring EPA review and approval;

d. Results of any RA verification sampling and associated decisions and action items.

e. Results of water quality monitoring activities

Respondent shall also submit weekly RA progress reports which, at a minimum addresses the aforementioned items. The EPA Project Manager shall be notified as soon as any deviations from the RAWP occur.

**3. Pre-Final Construction Inspections**

Within five (5) days after Respondent makes the preliminary determination that construction is complete for each discrete element of the remedial action, as defined in the

Final Remedial Action Work Plan, the Respondent shall notify U.S. EPA and the State for the purpose of conducting a pre-final inspection.

The pre-final inspections shall consist of a walk-through/boat tour inspection of the entire completed remedial action element with U.S. EPA. The inspection is to determine whether the project element is complete and consistent with the contract documents and the Remedial Action Work Plan, to review compliance with the CQAP, and to review field changes and change orders, and verify that SQOs have been achieved. The Respondent shall certify that each discrete element of the remedy has been constructed to meet the purpose and intent of the specifications. Retesting shall be completed by Respondent where deficiencies are identified. Within seven (7) days of the inspection, a pre-final construction inspection letter/report shall be submitted to EPA. The pre-final construction inspection report shall include both a summary of the major CQAP results and field changes, as well as minutes from the inspection. The pre-final inspection report shall outline the outstanding construction items, actions required to resolve items, completion date for these items, and a proposed date for final inspection. The completion dates for the items identified in the pre-final construction report shall be within ten (10) days of the pre-final construction inspection unless otherwise agreed to by EPA, but no later than February 14, 2003.

### 4. Final Construction Inspections

Within ten (10) days after completion of any work identified in the prefinal inspection reports, the Respondent shall notify U.S. EPA and the State for the purposes of conducting a final inspection of each discrete remedial action element. The final inspection shall occur on, or prior to, February 14, 2003, and shall consist of a walk-through/boat tour inspection of each discrete element of the remedial action by U.S. EPA and the Respondent. The prefinal inspection reports shall be used as a checklist with the final inspection focusing on the outstanding construction items identified in the prefinal inspections. Confirmation shall be made that outstanding items have been resolved. Resolution of all outstanding items should be documented in a Final Construction Letter/Report within 30 days of the final inspection.

### 5. Remedial Action Construction Report

Respondent shall follow U.S. EPA guidance for preparing Remedial Action Reports described in "Close Out Procedures for National Priorities List Sites", EPA 540-R-98-016, OSWER Directive 9320.2-09A-P, PB98-963223, January 2000 in submitting the following reports.

This report shall be submitted by the Respondent when the construction is complete for all discrete remedial action elements, but before all performance standards have been attained (i.e., prior to achieving natural recovery and long-term performance standards for mitigation).

Within thirty (30) days of the last successful final construction inspection, Respondent shall submit an Remedial Action Construction Report. In the report, a registered professional engineer and the Respondent's Project Coordinator shall state that the remedial action has been constructed in accordance with the design and specifications. The written report shall include as-built drawings signed and stamped by a professional

engineer, and other supporting documentation to demonstrate the CQAP was followed. The report shall contain the following statement, signed by a responsible official of a Respondent or the Respondent's Project Coordinator:

> "To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

### D. Performance Monitoring and Construction Quality Assurance

Performance monitoring shall be conducted to ensure that all performance standards are met, including cleanup verification methods and methods for determining compliance with performance standards and ARARs. Performance monitoring shall be conducted in accordance with the Construction Quality Assurance Plan which addresses all performance standards related to the remedial action construction, including achieving SQOs everywhere except natural recovery areas. Long-term performance standards to be achieved after remedial action construction is completed (e.g., achievement of SQOs in natural recovery areas) is addressed in the Operations, Maintenance & Monitoring Plan described in the proposed Remedial Action Consent Decree/SOW, or subsequent Order. The Construction Quality Assurance Plan and supporting documents shall provide a mechanism to ensure that all performance standards for the remedial action construction are met.

### E. Permitting and Site Access Plan

Under this SOW, the Respondent shall implement the Permitting and Site Access Plan included in the Final Design. This plan demonstrates how the remedial action plan will comply with the permitting requirements and shall address any real property and easement requirements. The plan provides a strategy and appropriate information for obtaining agreements for access to the site or associated areas as necessary for the implementation of the remedial action.

## V. SCHEDULE OF DELIVERABLES

The schedule for notification to EPA or submission of major deliverables to EPA is described below. If the date for submission of any item or notification required by this SOW occurs on a weekend or state or federal holiday, the date for submission of that item or notification is extended to the next working day following the weekend or holiday.

| # | Submission | Due Date |
|---|---|---|
| 1 | Weekly Progress Reports | As specified in Paragraph 67 in the Unilateral Administrative Order |
| 2 | Notify EPA in writing a description of the process and schedule for selecting the Remedial Action Consultant and Contractor | By October 1, 2002 |
| 3 | Submit Final design for 2002 action areas | By October 1, 2002 |
| 4 | Notify Remedial Action Consultant(s) that RFP is available | By October 8, 2002 |
| 5 | Propose Construction Management Consultant | By October 29, 2002 |
| 6 | Propose Remedial Action Construction Contractor | By November 1, 2002 |
| 7 | Submit Remedial Action Work Plan | By December 3, 2002 |
| 8 | Initiate Construction of Remedial Action | By December 14, 2002 |
| 9 | Completion of Construction | By February 14, 2003 |
| 10 | Pre-final Construction Inspection/Meeting | No later than five (5) days after completion of construction for each discrete element of the remedial action |
| 11 | Pre-final Construction Inspection Letter/Report(s) | Within seven (7) days after the pre-final construction inspection for each discrete element of the remedial action |
| 12 | Final Construction Inspection(s) | Within ten (10) days after completion of work identified in each prefinal construction inspection letter |
| 13 | Final Construction Letter/Report(s) | Within thirty (30) days after each final construction inspection/meeting |
| 14 | Remedial Action Construction Report | Within thirty (30) days after construction of all discrete elements are completed |

## Table 1—Sediment Quality Objectives

| Chemical | Sediment Quality Objective[a] |
|---|---|
| **Metals** (mg/kg dry weight; ppm) | |
| Antimony | 150 [A] |
| Arsenic | 57 [B] |
| Cadmium | 5.1 [B] |
| Copper | 390 [L] |
| Lead | 450 [B] |
| Mercury | 0.59 [L] |
| Nickel | >140 [A,B] |
| Silver | 6.1 [A] |
| Zinc | 410 [B] |
| **Organic Compounds** (µg/kg dry weight; ppb) | |
| **Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAH)** | 5,200 [L] |
| Naphthalene | 2,100 [L] |
| Acenaphthylene | 1,300 [A,B] |
| Acenaphthene | 500 [L] |
| Fluorene | 540 [L] |
| Phenanthrene | 1,500 [L] |
| Anthracene | 960 [L] |
| 2-Methylnaphthalene | 670 [L] |
| **High Molecular Weight PAH (HPAH)** | 17,000 [L] |
| Fluoranthene | 2,500 [L] |
| Pyrene | 3,300 [L] |
| Benz[a]anthracene | 1,600 [L] |
| Chrysene | 2,800 [L] |
| Benzofluoranthenes | 3,600 [L] |
| Benzo[a]pyrene | 1,600 [L] |
| Indeno[1,2,3-cd]pyrene | 690 [L] |
| Dibenz[a,h]anthracene | 230 [L] |
| Benzo[ghi]perylene | 720 [L] |
| **Chlorinated Organic Compounds** | |
| 1,3-Dichlorobenzene | 170 [A,L,B] |
| 1,4-Dichlorobenzene | 110 [B] |
| 1,2-Dichlorobenzene | 50 [L,B] |
| 1,2,4-Trichlorobenzene | 51 [A] |
| Hexachlorobenzene (HCB) | 22 [B] |
| **Total Polychlorinated Biphenyls (PCBs)** | 300 |
| **Phthalates** | |
| Dimethyl phthalate | 160 [L] |
| Diethyl phthalate | 200 [B] |
| Di-*n*-butyl phthalate | 1,400 [A,L] |
| Butyl benzyl phthalate | 900 [A,B] |
| Bis[2-ethylhexyl]phthalate | 1,300 [B] |

## Table 1—Sediment Quality Objectives *(Continued)*

| Chemical | Sediment Quality Objective[a] |
|---|---|
| Di-*n*-octyl phthalate | 6,200 [B] |
| **Phenols** | |
| Phenol | 420 [L] |
| 2-Methylphenol | 63 [A,L] |
| 4-Methylphenol | 670 [L] |
| 2,4-Dimethylphenol | 29 [L] |
| Pentachlorophenol | 360 [A] |
| **Miscellaneous Extractable Compounds** | |
| Benzyl alcohol | 73 [L] |
| Benzoic acid | 650 [L,B] |
| Dibenzofuran | 540 [L] |
| Hexachlorobutadiene | 11 [B] |
| N-nitrosodiphenylamine | 28 [B] |
| **Volatile Organic Compounds** | |
| Tetrachloroethene | 57 [B] |
| Ethylbenzene | 10 [B] |
| Total xylenes | 40 [B] |
| **Pesticides** | |
| p,p'-DDE | 9 [B] |
| p,p'-DDD | 16 [B] |
| p,p'-DDT | 34 [B] |

[a] Lowest apparent effects threshold among amphipod, oyster, and benthic infauna:

A - amphipod mortality bioassay
L - oyster larvae abnormality bioassay
B - benthic infauna
* - The sediment quality objective for human health was revised in EPA's 1997 ESD to a PCB SQO of 300 ug/kg.

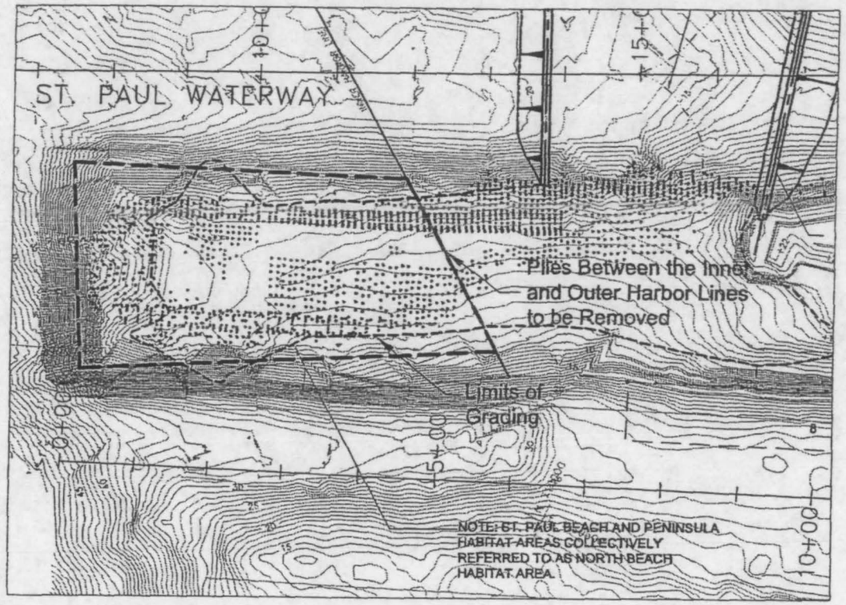
TABLE 2 – Biological Criteria to be used for Thea Foss Waterway RD/RA

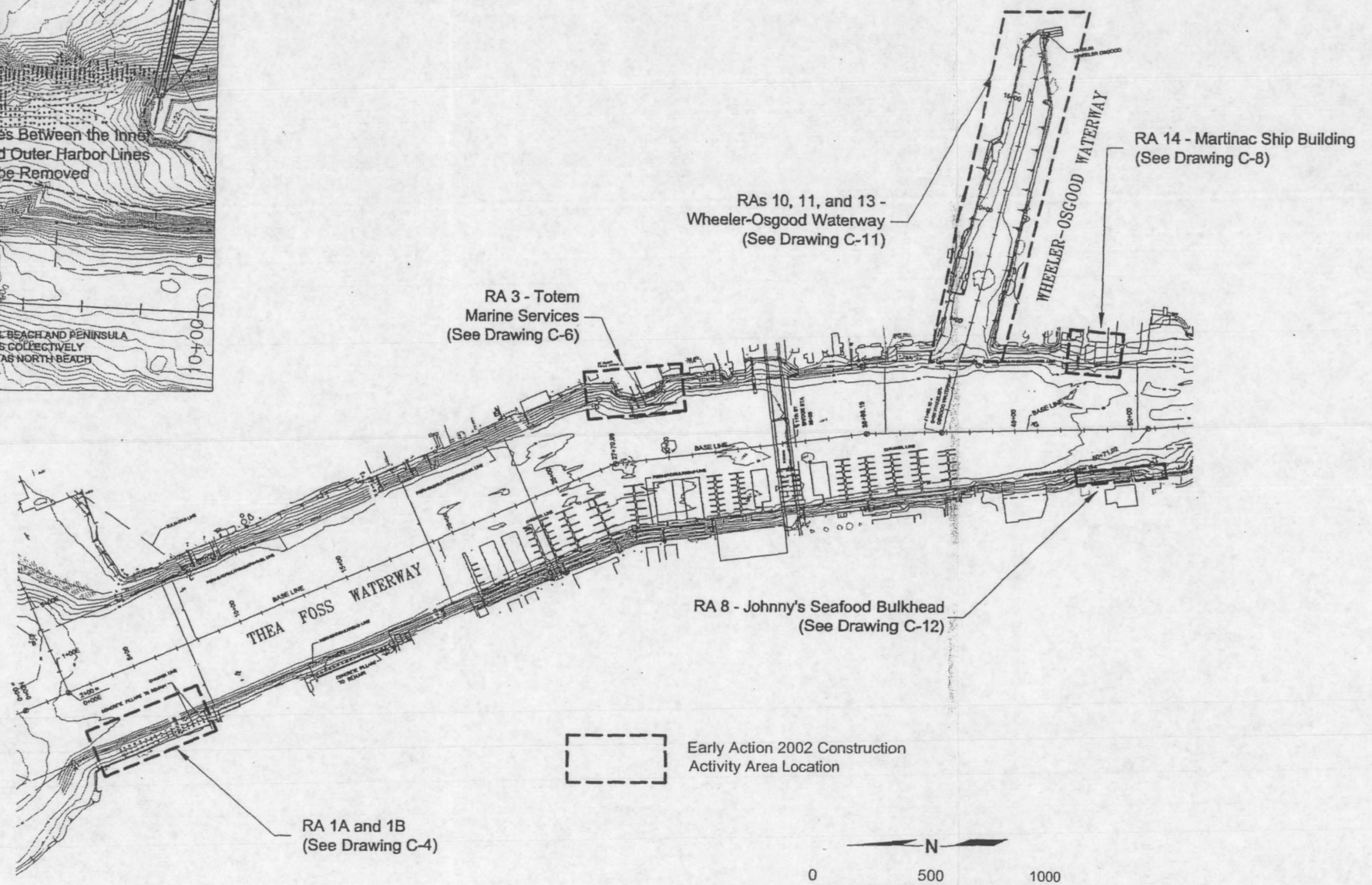
| Bioassay | Negative Control Performance Standard | Reference Sediment Performance Standard | Sediment Quality Standards Interpretation Endpoints (Hylebos RD/RA performance criteria) | Minimum Cleanup Level/SIZ Interpretation Endpoints |
|---|---|---|---|---|
| Amphipod (M expressed as %) | $M_C$ < 10% | $M_R$ < 25% | $M_T$ > 25% Absolute and $M_T$ vs $M_R$ SD (p=.05) | $M_T - M_R$ > 30% and $M_T$ vs $M_R$ SD (p=.05) |
| Larval (N expressed as actual counts) | $N_C$ I ³ 0.70 | $N_R$ $N_C$ ³ 0.65 (per QA/QC guidance) | $N_T/N_C + N_R/N_C$ < 0.85 and $N_T/N_C$ vs $N_R/N_C$ SD (p=.10) | $N_T/N_C + N_R/N_C$ < 0.70 and $N_T/N_C$ vs $N_R/N_C$ SD (p=.10) |
| *Neanthes* growth (MIG in mg/ind/d dry) | $M_C$ < 10% and MIG ³ 0.72 mg/ind/d (dry) (or Case By Case) | $MIG_R$ $MIG_C$ ³ 0.80 | $MIG_T/MIG_R$ < 0.70 and $MIG_T$ vs $MIG_R$ SD (p=.05) | $MIG_T/MIG_R$ < 0.50 and $MIG_T$ vs $MIG_R$ SD (p=.05) |
| Microtox | Case By Case | Case By Case (PSDDA, $BLD_R$ £ 20%) | $ML_T + ML_R$ < 0.80 and $ML_T$ vs $ML_R$ SD (p=.05) | No Microtox MCUL criteria are established SQS level hit is valid for 2 hit rule |

M = mortality, N = normals, I = initial count, MIG = mean individual growth rate, BLD = blank-corrected light decrease
SD = statistically different, NOCN = no other conditions necessary, N/A = not applicable
Subscripts: R = reference sediment, C = negative control, T = test sediment

DRAFT SMS EVALUATION ENDPOINTS (BIOASSAYS), Ecology 6/25/98

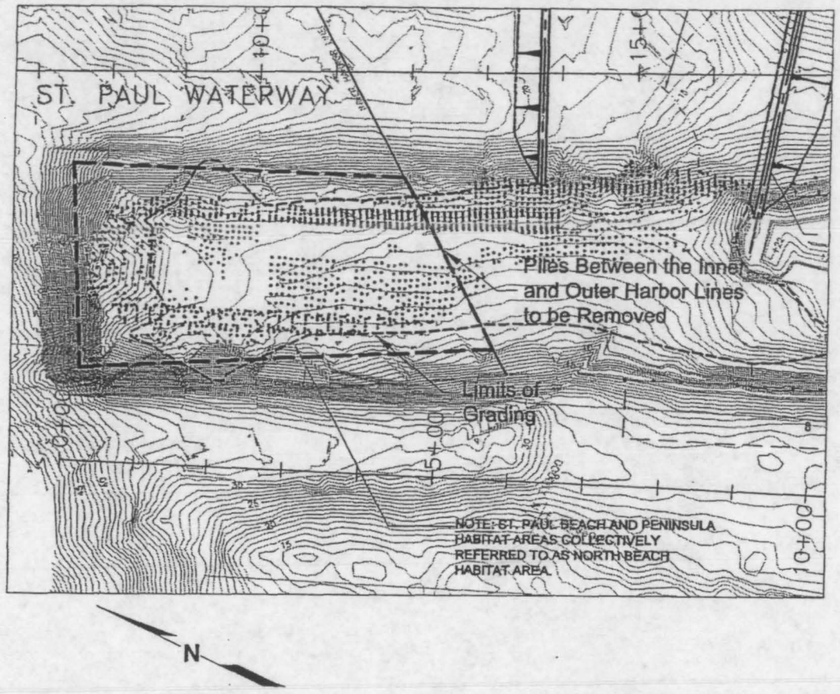
## *Location Map Showing Early Action 2002 Construction Activity Areas*

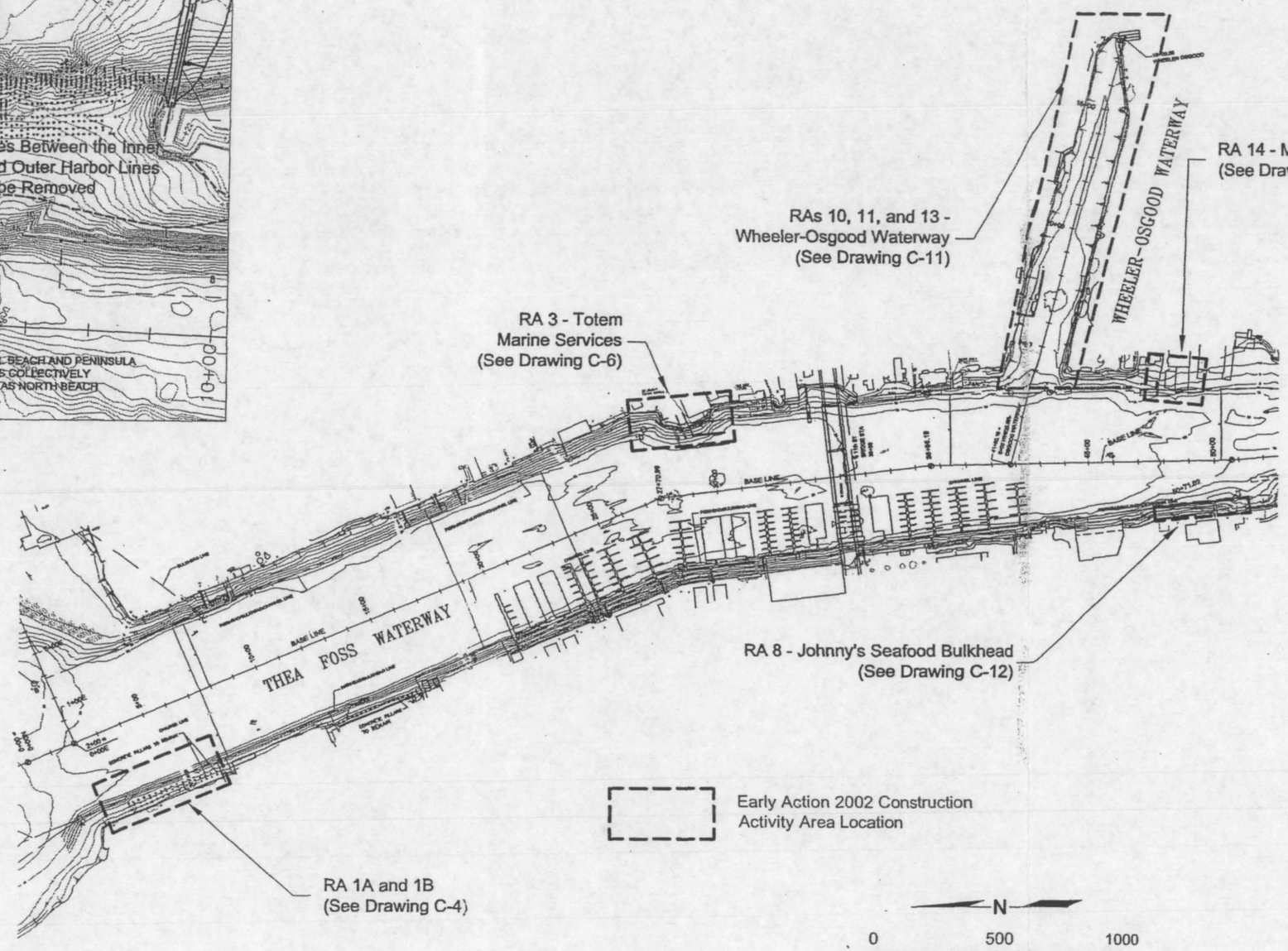



***Note:*** Drawings referenced on this figure will be included in the "Thea Foss and Wheeler-Osgood Waterways-2002 Construction Project" submittal to EPA.

## *Location Map Showing Early Action 2002 Construction Activity Areas*




***Note:*** Drawings referenced on this figure will be included in the "Thea Foss and Wheeler-Osgood Waterways-2002 Construction Project" submittal to EPA.

*Final Design*
*Permitting and Site Access Plan*
*Thea Foss and Wheeler-Osgood*
*Waterways Remediation*
*2002 Construction Project*
*Tacoma, Washington*

*Unilateral Administrative Order*
*U.S. EPA Docket No.*
*CERCLA-10-2002-0153*

*Prepared for*
*City of Tacoma*

*October 9, 2002*
*4072-69*

## CONTENTS



## TABLE



## FIGURE

# FINAL DESIGN
# PERMITTING AND SITE ACCESS PLAN
# THEA FOSS AND WHEELER-OSGOOD WATERWAYS REMEDIATION
# 2002 CONSTRUCTION PROJECT
# TACOMA, WASHINGTON

## 1.0 INTRODUCTION

This Permitting and Site Access Plan (PSAP) has been prepared as part of the Remedial Design for the Thea Foss and Wheeler-Osgood Waterways Remediation/St. Paul Confined Disposal Facility Project within the Commencement Bay Nearshore/Tidelands (CB/NT) Superfund Site. This PSAP describes how remedial design plans will comply with permitting substantive requirements, permitting requirements, and how property access and easement rights will be assured. This PSAP addresses requirements of the October 1, 2002, Unilateral Order on Consent between the City of Tacoma and EPA for design and construction activities. Planned remedial activities include capping of areas RA 1A and RA 1B, RA 3, RA 10, RA 11, and RA 13. Capping locations are identified on the project plan sheets. Project construction will also involve removal of slag deposits and rubble from area RA 3; removal of wood, concrete, sandblasting residues, and miscellaneous metal debris from areas RA 10, RA 11, and RA 13; and removal of timber pilings from the mouth of the Thea Foss Waterway. No sediment dredging or in-water disposal activities are planned for this phase of remediation.

Section 2.0 addresses permits, approvals, and licenses pertinent to the remedial action. Section 3.0 addresses property access and easement. Section 4.0 provides a brief summary of how remedial designs will satisfy the substantive requirements, including applicable or relevant and appropriate requirements (ARARs) and other regulatory considerations to be considered (TBCs), as identified in the 1989 CB/NT Record of Decision (ROD; EPA 1989) and the Explanation of Significant Differences (ESD) for the ROD (EPA 2000).

## 2.0 PERMIT, APPROVAL, AND LICENSING CONSIDERATIONS

Under CERCLA, permitting is considered to be an administrative requirement, and CERCLA actions conducted on site are exempt from administrative requirements. The planned on-site remedial design actions will not require that any state or federal permits be obtained; however, these actions are required to

comply with the substantive requirements of the applicable permits. Local permitting requirements do not fall under CERCLA jurisdiction, and are considered in light of the planned remedial design. Approvals for off-site waste disposal will also be required from the receiving facility and the EPA.

In addition, construction contractors must be licensed and bonded consistent with the nature of the work to be performed. The bid selection process will ensure that only properly licensed and bonded construction contractors are used to perform remedial action work.

## *2.1 Upland Disposal of Debris and Other Solid Wastes*

As summarized above, project activities includes removal of wood, concrete, and metal construction debris and rubble. It is expected that these materials will be suitable for:

1) Recycling by the Contractor as practical; and/or

2) Management and disposal as Inert Waste or Demolition Waste at off-site construction fill site(s), in accordance with requirements of Chapter 173-304 WAC (Minimum Functional Standards for Solid Waste Handling).

In addition, treated wooden pilings, slag deposits, sandblasting residues, and other materials not suitable for disposal as Inert Waste or Demolition Waste will be shipped for upland disposal as a Problem Waste (as defined in Chapter 173-304 WAC). Disposal facilities include lined landfills permitted by the EPA under RCRA Subtitle D, as well as state and local authorities.

Based on available analytical data and general site knowledge, materials for off-site upland disposal are not expected to designate as Dangerous Wastes under state regulations (Chapter 173-303 WAC). It is unlikely that Dangerous Wastes will be discovered during construction, but in this event they would be handled, shipped and disposed of off site in accordance with requirements of Chapter 173-303 WAC. This includes disposal at a RCRA Subtitle C landfill.

### 2.1.1 Facility Approval and Compliance

Prior to arranging for the disposal of wastes at a landfill, the compliance status of the landfill facility will be documented by the City. Facilities receiving Problem Waste must be in compliance with Chapter 173-304 WAC, and facilities receiving Dangerous Wastes for treatment and/or disposal must be in compliance with Chapter 173-303 WAC for in-state disposal, and 40 CFR 262

and 264 and/or regulations of the receiving state for out-of-state disposal. Compliance will be documented approximately two months prior to shipping wastes off site and submitted to EPA for approval. The City will notify EPA which facility(ies) will be receiving the waste materials one week prior to disposal.

Potential upland disposal of debris and other materials from CERCLA sites requires EPA approval based on the Off-Site Disposal Rule (40 CFR 300.440). The Off-Site Disposal Rule requires management and operation of upland disposal facilities in compliance with ARARs at the state and federal levels.

Prior to acceptance of wastes, off-site disposal facilities will require analytical and/or other characterization data. Minimum requirements for characterization will be established by the receiving facilities. The Contractor will perform additional testing of materials if existing data supplied by the City is not sufficient.

## 3.0 SITE ACCESS AND EASEMENTS

### *3.1 Property Owners*

Figure 1 depicts ownership of properties adjacent to areas of the Thea Foss, Wheeler-Osgood, and St. Paul Waterways where the remedial actions will be completed. The City of Tacoma owns certain upland properties on the west side of the Thea Foss Waterway. The City also has an easement along East 11th Street.

It is anticipated that much of the construction activity for debris removal and cap placement will be accomplished offshore. Upland property owners who have resolved their CERCLA liability with EPA by helping to fund remedial actions in the Thea Foss and Wheeler-Osgood Waterways are executing a Consent Decree with EPA that will require them to provide reasonable access to EPA and the performing parties including their respective consultants and contractors performing work under the Decree. However, it is unlikely that the Consent Decree, including this provision, will be in place at the time that work is performed under this Order. Therefore, the City is working with the owners to obtain access rights for activities performed under this contract. In advance of the remedial action, the City will attempt to secure written construction easements from these upland property owners, as needed, to allow for implementation of the remedial action. If the City is unsuccessful in this effort, they will seek EPA assistance in obtaining the necessary access. Obtaining

construction easements may require 90 days or more which may adversely impact performance of these tasks under this contract.

In addition, the Contracting Entity will establish specific requirements for the Contractor(s) regarding site access and staging area use that are included in the contract specifications. At a minimum, the Contractor(s) will be required to abide by the Contracting Entity's safety and security requirements for the site.

The State of Washington Department of Natural Resources, owner of the subtidal lands, has been involved throughout the process and generally concurs with the remedial action approach.

### *3.2 Community Notification*

The EPA will coordinate public notification processes in conjunction with the Port. EPA will publish fact sheets as necessary for this project. The fact sheets will identify key contact personnel. Also, EPA will sponsor any informational public meetings as necessary. The City and Contractor will be available at EPA's request to participate in public meetings.

## 4.0 SUMMARY OF MEASURES TO SATISFY SUBSTANTIVE REQUIREMENTS

Applicable or relevant and appropriate requirements (ARARs) include promulgated environmental criteria, standards, and other requirements as identified in the 1989 ROD. The Endangered Species Act (ESA) was added as an ARAR in the ESD. No waiver of any ARAR was sought or invoked in the ROD or ESD. For remedial actions conducted under CERCLA, administrative requirements are not ARARs. As described in Section 10.3 of the Round 3 Report, the proposed remedial action complies with ARARs. Table 1 lists the ARARs for this remedial action.

The primary ARARs for which there are substantive requirements applicable to planned construction activities for the remedial action are as follows:

- Federal Clean Water Act;
- Federal Rivers and Harbors Act;
- Endangered Species Act;
- State of Washington Water Pollution Control Act;
- State of Washington Shoreline Management Act;
- State of Washington Hydraulics Code;
- State of Washington Solid Waste Management Act;

- Puyallup Tribe Water Quality Program; and
- Puyallup Tribe of Indians Settlement Act (1989).

The Washington Hazardous Waste Management Act and Resource Conservation and Recovery Act (RCRA) are ARARs only if Dangerous Wastes, as defined under Chapter 173-303 WAC, are generated (not expected).

The following sections provide a brief summary of the substantive requirements that will be satisfied by the planned remedial actions. ARARs applicable to other elements of the Thea Foss CERCLA actions to be performed separately will be included with future documents.

## *4.1 Sediment Capping*

An overall objective of the planned remedial action is to improve and protect water quality in Commencement Bay. Construction for remedial actions will need to be conducted in a manner that satisfies the substantive requirements of:

1. Clean Water Act Section 401: 33 CFR Parts 320, 323, and 328; and Clean Water Act Section 404 and 404(b)(1) Guidelines: CFR Part 230;
2. Rivers and Harbors Act (33 CFR 320 and 322);
3. Washington State Hydraulic Code (Chapter 220-110 WAC), including Section 030, Hydraulic Code Approvals - Procedures;
4. Puget Sound Water Quality Control Act (Chapter 90.70 RCW);
5. State Shorelines Management Act (Chapter 90.58 RCW); and
6. Puyallup Tribe of Indians Settlement Act (1989).

Elements of the remedial action that help satisfy these requirements include the following:

- Conducting capping and debris removal in accordance with procedures described in the project Construction Quality Assurance Plan (CQAP);

- Capping contaminated sediment areas using appropriate and clean (tested) cap materials;

- Capping NAPL seep areas using appropriate and clean (tested) materials;

- Sequencing of intertidal work to minimize particulate dispersal and suspension;

- Working with the Natural Resource Trustees to complete in-water work before February 15 to protect outmigrating juvenile salmonids, and ceasing work if adverse effects to salmonids are observed;

- Monitoring to verify the success of the sediment cleanup action relative to the ROD, including the monitoring of surface sediments following capping . Detailed procedures for monitoring and evaluation completed during construction (e.g., post-capping verification sampling and analysis) are described in the CQAP. Detailed procedures for monitoring and evaluation completed following sediment capping are not part of this contract. These activities are described in the Operations, Maintenance, and Monitoring Plan (OMMP).

Impacts to aquatic habitat from capping in the Thea Foss and Wheeler-Osgood Waterways are offset by the enhancement of existing habitat and restoration of existing subtidal or upland areas into higher value shallow water (intertidal) habitat. Habitat mitigation will be completed as part of future construction, and is not included as part of the remedial action included with the 2002 construction. Discussion of associated ARARs will be completed with design documents for future remedial actions.

Mitigation for impacts to aquatic habitat from capping in the Thea Foss and Wheeler-Osgood Waterways is not necessary for this action. However, habitat mitigation requirements for these actions will be considered as part of the Final Design for the Thea Foss and Wheeler-Osgood Waterways Remediation Project and may be required as part of overall project.

## *4.2 Water Quality*

Another primary purpose of the planned remedial action is to improve and protect water quality in Commencement Bay and to satisfy federal and state Water Quality Standards (40 CFR 131 and Chapter 173-201A WAC, respectively). The requirements of the Washington Water Pollution Control Act and Chapter 173-201 WAC are similar to the requirements of Section 401 of the CWA. The Puyallup Tribal interim water quality standards are the same as the Washington water quality standards.

In addition to achieving constituent-based water quality numerical standards, the following water quality-related requirements will be satisfied by the planned remedial actions.

### 4.2.1 Surface Water Discharges Associated with Remedial Construction

Temporary control measures will be undertaken to manage potential water quality impacts to runoff and stormwater during planned remedial construction. Remedial actions associated with cap placement and debris removal will be conducted in a manner to satisfy several substantive requirements designed to protect surface water quality and aquatic species, including:

1. Dredge and fill standards and requirements for work in navigable waters per the Clean Water Act and Rivers and Harbors Act (33 CFR Parts 320-328 and 40 CFR Part 230 including Section 404(b)(1) guidelines);
2. Water Quality Standards for Surface Waters (Chapter 173-201A WAC);
3. Washington Hydraulic Code (Chapter 220-110 WAC); and
4. Endangered Species Act (50 CFR 402).

Elements of the remedial action that help satisfy these requirements include the following:

- Conducting in-water capping in a manner that minimizes sediment resuspension; and

- Monitoring water quality during construction to ensure that water quality standards are not exceeded, as presented in the CQAP.

The National Pollutant Discharge Elimination System (NPDES) Permit Program (Clean Water Act Section 402) and implementing Washington State regulations (Chapter 173-220 WAC) require compliance with water quality-related standards and application of all known, available, and reasonable treatment (AKART) prior to discharges of pollutants to surface waters. These standards also call for the use of best management practices (BMPs) to prevent or minimize the presence of pollutants in wastewaters that are to be discharged to surface waters. A variety of remedial action elements will be implemented to satisfy these requirements, including the following:

- Sequencing intertidal work to minimize particulate dispersal and suspension; and

- Monitoring water quality during sediment capping to ensure that water quality standards are not exceeded at designated points of compliance, as presented in the CQAP.

In addition, temporary construction operations will be undertaken to control impacts to runoff and stormwater during demolition of existing piers and Simpson's log haul out facility in the St. Paul Waterway, as well as demolition of marina facilities if required during their temporary relocation. Remedial actions will be designed to be consistent with the substantive requirements of the NPDES Permit Program (Chapter 173-220 WAC) and state Water Quality Standards (Chapter 173-201A WAC). To satisfy these requirements, drainage control will be implemented in areas where the removed pier pilings/timbers, and/or construction/waterway debris may be staged prior to off-site disposal or reuse.

### *4.3 Shoreline Protection*

Capping and related construction activities for the Thea Foss and Wheeler-Osgood Waterways are subject to requirements of the City of Tacoma Shoreline Ordinance (Chapter 13.10). The waterways are located within the "S-8" and "S-10" Shoreline Districts. Planned construction activities are consistent with the state and city shoreline requirements. In keeping with the policies and objectives of the City of Tacoma Shoreline Ordinance, remedial actions have been designed to:

- Reduce loss of shoreline;
- Stabilize existing and remaining shoreline areas; and
- Retain a property configuration that encourages water-dependent uses.

### *4.4 Solid Waste Management and Disposal*

Debris and other materials that are determined to be Problem Wastes will be managed in accordance with substantive requirements derived from the Minimum Functional Standards (Chapter 173-304 WAC). Although not expected, materials determined to be Dangerous Wastes will be managed and disposed of in accordance with substantive requirements of Chapter 173-303 WAC, 40 CFR Parts 261-265, or state-specific regulations for wastes treated, stored, or disposed of in states other than Washington. All off-site waste disposal is subject to EPA approval under the Off-Site Disposal Rule (40 CFR 300.440).

### 4.4.1 Waste Management during Remedial Action

The following actions will be undertaken to meet the substantive requirements for Solid Waste management (and Dangerous Waste management if needed) during remedial construction:

- Accumulation of various demolition debris materials in a temporary staging area, as needed, with appropriate stormwater controls; and

- Implementation of BMPs as appropriate (e.g., waste minimization, recycling, product substitution) throughout remediation to minimize solid and hazardous waste generation.

### 4.4.2 Post-Remedial Action Control and Monitoring

Post-remedial actions associated with planned construction activities include institutional controls as needed to limit site access and thus potential damage to sediment capping areas.

## *4.5 Endangered Species Act*

ESA consultation is currently in progress to outline significant issues and recommended conservation measures for construction activities. These measures are expected to be finalized as part of future ESA concurrence letters from the National Marine Fisheries Service and the U.S. Fish and Wildlife Service.

## 5.0 REFERENCES

City of Tacoma 1999. Round 3 Data Evaluation Report and Pre-Remedial Design Evaluation Report, Thea Foss and Wheeler-Osgood Waterways Pre-Remedial Design, Tacoma, Washington. October 1999.

EPA 1989. Commencement Bay Nearshore/Tideflats Record of Decision. US EPA Region 10, September 1989.

EPA 2000. Final Explanation of Significant Differences, Commencement Bay Nearshore/Tideflats Superfund Site. US EPA Region 10. August 3, 2000.

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## Table 1 - ARARs for the Thea Foss and Wheeler-Osgood Waterways Remediation - 2002 Construction Project



| Statutory Basis for Applicable or Relevant and Appropriate Requirements (ARARs) | Implementing Regulatory Program | General Summary of Requirements |
|---|---|---|
| **Federal ARARs** | | |
| Clean Water Act Section 401 | 33 CFR Parts 320, 323, 324, 328 | Requires that dredged materials (including debris removal), and related in-water construction activities do not violate applicable water quality standards. May allow for designation of mixing zones, within which standards may be exceeded, but beyond which applicable standards must be met. |
| Clean Water Act Section 404 and 404(b)(1) Guidelines | 40 CFR Part 230 | Regulates the discharge of dredged or fill materials in the waters of the United States, and promulgates guidelines to evaluate such discharges. The guidelines require demonstration that the proposed discharge will not:<br>• Violate applicable water quality standards;<br>• Violate any applicable toxic effluent standard under CWA Section 307;<br>• Jeopardize the existence of an endangered or threatened species or their habitat; nor<br>• Contribute to significant degradation of the waters of the United States.<br>Also requires that unavoidable impacts to special aquatic sites (e.g., wetlands) be minimized. Impacts which cannot be minimized must be compensated for through mitigation. |
| Clean Water Act Section 402 | 40 CFR Parts 122, 125 (NPDES) | Establishes program permitting point source discharges to navigable waters. In Washington, the program is delegated to the state (Chapter 90.48 RCW). Does not apply to discharges authorized under CWA Section 404. |
| Rivers and Harbors Act (Section 10) (33 USC 403) | 33 CFR Parts 320, 322 | Prohibits unauthorized activities that obstruct or alter a navigable waterway. U.S. Corps reviews and approves work in navigable waters that may affect the navigable capacity of a water body. |
| Endangered Species Act (16 USC 1536(a)(d) | 50 CFR Part 402 | Requires evaluation of action's impacts on listed (or proposed for listing) species of fish, wildlife, or plants. |
| Resource Conservation and Recovery Act (RCRA) (42 USC Section 6901 *et seq*) | 40 CFR 257, 258, and 268 | Regulates the handling and disposal of hazardous and non-hazardous solid waste. Program implemented in Washington State by Dangerous Waste regulations. See "State ARARs" below. |
| Federal Coastal Zone Management Act (16 USC Section 1451 et seq.) | None | Regulates actions that affect coastal zones and establish standards for state programs. Program administered in Washington State by Ecology's Shoreline Management Act. See "State ARARs" below. |
| Fish and Wildlife Coordination Act (16 USC 661 et seq.) | 40 CFR Part 6.302(3) | Requires consultation with USFWS, NMFS, and state wildlife agencies for actions that affect natural stream or body of water. |

## Table 1 - ARARs for the Thea Foss and Wheeler-Osgood Waterways Remediation - 2002 Construction Project



| Statutory Basis for Applicable or Relevant and Appropriate Requirements (ARARs) | Implementing Regulatory Program | General Summary of Requirements |
|---|---|---|
| **State ARARs** | | |
| Water Pollution Control Act (Chapter 90.48 RCW) | Chapter 173-220 WAC (NPDES) | Establishes permitting requirements for point source discharges to surface waters of Washington State. |
| | Chapter 173-201A (Water Quality Standard for Surface Waters) | Establishes water quality standards for surface waters of the state.. |
| | Chapter 173-204 WAC (Sediment Management Standards) | Establishes procedures and requirements for managing contaminated sediments. Promulgated after the CB/NT ROD was issued. Substantive requirements are applicable. |
| Shoreline Management Act (Chapter 90.58 RCW) | Chapter 173-14 WAC | Establishes requirements for substantial development occurring within waters of the state or within 200 feet of a shoreline, and requires that activities in coastal zones be consistent with local regulations. |
| State Hydraulic Code (Chapter 75.20 RCW) | Chapter 220-110 WAC | Establishes requirements for work that diverts, obstructs, or changes natural flow or bed of marine or fresh waters. |
| Solid Waste Management Act (Chapter 70.95 RCW) | Chapter 173-304 WAC | Establishes Minimum Functional Standards for handling and disposal of solid waste in Washington. |
| Hazardous Waste Management Act (Chapter 70.105 RCW) | Chapter 173-303 WAC | Regulates dangerous waste and provides criteria for determining if a waste is a dangerous solid waste and for handling such wastes. |
| **Tribal ARARs** | | |
| Puyallup Tribe Water Quality Program (Puyallup Tribal Council Resolution No. 151288C) | None | Establishes interim tribal water quality standards by adopting Washington Water Quality Standards. |
| Puyallup Tribe of Indians Settlement Act of 1989 (Public Law 101-41) | Statute 83 | Establishes standards for fisheries enhancement and protection. |

*Final Design*
*Construction Quality Assurance Plan*
*Thea Foss and Wheeler-Osgood*
*Waterways Remediation*
*2002 Construction Project*
*Tacoma, Washington*

*Unilateral Administrative Order*
*U.S. EPA Docket No.*
*CERCLA-10-2002-0153*

*Prepared for*
*City of Tacoma*

*October 9, 2002*
*4072-69*

## CONTENTS



## TABLES



## FIGURES

CONTENTS (Continued) Page

# FINAL DESIGN
# CONSTRUCTION QUALITY ASSURANCE PLAN
# THEA FOSS AND WHEELER-OSGOOD WATERWAYS REMEDIATION
# 2002 CONSTRUCTION PROJECT
# TACOMA, WASHINGTON

## 1.0 INTRODUCTION

The Construction Quality Assurance Plan (CQAP) describes how the City of Tacoma (City) and the selected contractor (Contractor) will construct the early action items of the remediation project in a manner that complies with the conditions and requirements of the Remedial Design documents approved by U.S. Environmental Protection Agency (EPA) for the Thea Foss and Wheeler-Osgood Waterways Remediation 2002 Construction Project.

This document identifies the quality assurance/quality control (QA/QC) procedures that will be used in construction management for the early action tasks of Thea Foss and Wheeler-Osgood Waterways Remediation 2002 Construction Project. It specifies the types of environmental monitoring that will be performed and how modifications to the construction procedures will be directed, as necessary, in response to monitoring data. A summary of the required inspections, surveys, monitoring actions, verification samples, reporting mechanisms, and documentation is provided. Further, it delineates the QA protocols necessary for project personnel to understand the construction QC issues, monitoring and feedback processes, and potential corrective actions.

The work discussed in this document will be conducted under a Unilateral Administrative Order (UAO) and associated Statement of Work (SOW) prepared by EPA (2002). Under this agreement, the Contractor will have to prepare a Remedial Action Work Plan and other submittals as called for in the design documents. No physical work at the site may be performed before approval of the necessary plans.

- The Contractor will use this Construction Quality Assurance Plan (CQAP) together with the Contract Plans and Specifications to develop the required pre-construction submittals that outline the Contractor-specific elements of QA/QC implementation for this project. Relevant Contractor submittals will be packaged as a Remedial Action Work Plan that will include the following:

    - Project Work Plan
    - Contractor Quality Control Plan (CQC Plan);

- Sediment Verification Sampling Field Sampling Plan/Quality Assurance Project Plan (FSP/QAPP);
- Remedial Action Health and Safety Plan (HASP);
- Environmental Protection Plan;
- Water Quality Monitoring FSP/QAPP; and
- Settlement Monitoring Plan.

## 2.0 ELEMENTS OF THE CQAP

The remainder of the CQAP is organized as follows:

- **Section 3.0 Project Roles and Responsibilities** presents the roles and responsibilities of the parties involved in the remediation action;
- **Section 4.0 Contractor/Subcontractor Qualifications** describes the qualifications and experience required for the contractor and any selected subcontractors;
- **Section 5.0 Inspection Activities (Including Construction Monitoring)** summarizes the inspections, tests, sampling, and monitoring activities to verify compliance with the contract documents;
- **Section 6.0 Documentation and Reporting** describes the submittal requirements before and during construction activities;
- **Section 7.0 Remediation Action Construction Elements** provides a task-by-task description of construction elements (capping, debris removal and disposal, pile removal and disposal, etc.), their associated QC measures, and environmental monitoring requirements; and
- **Section 8.0 References.**

## 3.0 PROJECT ROLES AND RESPONSIBILITIES

The roles and responsibilities of the parties involved in the remediation action have been formalized in an UAO prepared by EPA. An organization chart depicting project administration, management, and oversight duties is presented on Figure 1.

### 3.1 U.S. Environmental Protection Agency (EPA)

The EPA is the regulatory authority and responsible agency for overseeing and authorizing the remedial action. In this capacity, EPA will review and approve these design documents, as well as the CQC Plan, Environmental Protection Plan, and other Contractor submittals to ensure that the Contractor's QA/QC program is consistent with the remedial design objectives. A Project Monitor will be designated to exercise project oversight for the agency and to coordinate with the City. The EPA will make final decisions to resolve unforeseen problems that may change the project components or the manner in which the construction is undertaken.

### 3.2 City of Tacoma (Project Proponent)

The construction project will be managed by the City of Tacoma and their Construction Management Team and executed by Contractor(s) specializing in the required in-water remedial activities, including slope stabilization, sheet pile installation, and offshore capping.

On-site responsibility for construction management and contract administration will be assigned by the City to the Project Engineer and the Construction Management Team. The Project Engineer will have total authority and responsibility to deal with the Contractor on all contractual matters, and to ensure that the Contractor complies with contract requirements and provides all necessary quality assurance information. The City may also employ subordinate inspectors as part of the Construction Management Team to monitor the contract work, but the interface on all contractual matters will be between the Project Engineer and the Contractor.

The Project Engineer will be responsible for overseeing the implementation of the CQAP, including the required monitoring, sampling, testing, and reporting. Included with this responsibility is the monitoring of the Contractor's QC activities to ensure that project construction is conducted in accordance with the contract Plans and Specifications. These activities may be assigned to Construction Management Team, subordinate inspectors, or conducted by consultants with the requisite expertise and experience.

### 3.3 Contractor

The Contractor will be required to perform the remedial construction activities, including slope stabilization, sheet pile wall installation, removal and disposal of piles and debris, and in-water capping, in accordance with the contract Plans

and Specifications, as approved by EPA. The Contractor will be selected through an internal process by the City. Contractors considered for the project will be pre-qualified by the City prior to selection to determine that the Contractor is qualified, in terms of experience and capability, to perform the work. The City will require a Statement of Qualifications (SOQ) from all Contractors considered.

Direction of the work for the Contractor will be through an on-site Superintendent who will be responsible for executing the work in full compliance with the contract Plans and Specifications. The Superintendent will deal with the Project Engineer to resolve job-related problems and day-to-day project management. The Superintendent may utilize one or more foremen to directly supervise the major construction activities. The Superintendent will exercise supervision over subcontractors, if subcontractors are utilized.

The contract Specifications require the Contractor to develop and implement a Contractor Quality Control (CQC) Plan through which the Contractor assures compliance with the requirements of the contract. The CQC Supervisor will have written CQC duties and responsibilities delegated by an officer of the firm. The CQC Plan will state the chain of command for the CQC team, including identification of responsibilities for each member, to ensure that any actions related to the quality of work will be executed in an accurate and expeditious manner.

The Contractor will also develop and implement an Environmental Protection Plan as well as employ a Health and Safety Manager to develop and implement a Remedial Action HASP. Each of these plans will contain details of the chain of command and personnel responsibilities, as discussed in the contract Specifications. The following sections of this CQAP and the contract Specifications contain additional details concerning the Contractor's responsibilities and required submittals.

### *3.4 Subcontractors*

The Contractor may employ subcontractors to perform selected phases of the work for which they have special expertise. Examples would be a firm specializing in hydrographic surveys, or pile removal activities. The subcontractors are responsible to the prime Contractor for the quality of their work, protection of the environment, and the health and safety of their personnel in accordance with the contractor's CQC Plan, Environmental Protection Plan, and HASP (see Section 6.0). The subcontractor's principals will designate a job site foreman with responsibility to see that the work is conducted in accordance with the contract requirements.

### *3.5 Consultants*

During the course of construction, consultants may be utilized to ensure that the design objectives are realized and that the project is constructed in accordance with the contract Plans and Specifications. Each consultant will have a project manager who will interface with the City in carrying out their responsibilities.

## 4.0 CONTRACTOR/SUBCONTRACTOR QUALIFICATIONS

Prior to selection, each prospective Contractor must provide the City with documentation which demonstrates their expertise, experience, and capability to satisfactorily prosecute the work. The Contractor will employ, as part of its permanent organization, senior, knowledgeable, and experienced personnel to run the project. For example, the Superintendent will be required to have at least 10 years experience in the type of work being contracted. The journeyman operators, surveyors, and other Contractor personnel performing key jobs must also have the demonstrated ability and skills to satisfactorily perform their respective assignments.

The CQC Supervisor, and the organization as a whole, must have documented qualifications and experience to perform independent checks on the Contractor's operations necessary to determine compliance with the contract provisions. Additionally, any subcontractors utilized in the work must have demonstrated to the satisfaction of the City that they are qualified and have satisfactorily performed the type of work for which they will be engaged. However, responsibility for subcontractor performance rests with the prime Contractor. All Contractor and subcontractor personnel will be required to have current health and safety training required by the Washington State Department of Labor and Industries (Chapter 296-62 WAC, Subpart P, Hazardous Waste Operations and Emergency Response), including on-site training.

## 5.0 INSPECTION, SAMPLING, AND MONITORING ACTIVITIES

The Project Engineer and/or the Contractor will conduct inspections, sampling and testing, and monitoring activities to ensure compliance with the terms and conditions of the contract. Table 1 summarizes the required monitoring activities and frequencies for each of the construction elements. Documentation of these activities is discussed in Section 6.0.

Inspection, sampling, and monitoring activities include:

- Verification that in-water structures and debris have been properly removed and disposed of.
- Verification that sheet pile structures and slope caps have been properly installed to the depths and extents specified and using the required materials.
- Monitoring for potential settlements or horizontal movements of structures adjacent to dredging and capping activities.
- Verification of cap thickness and elevation.
- Verification of conformance with sediment quality monitoring procedures, and compliance with Commencement Bay Sediment Quality Objectives (SQOs).
- Verification of conformance with water quality monitoring procedures, and compliance with Washington State Surface Water Quality Standards during in-water construction activities.
- Verification that imported materials comply with contract requirements for quality, durability, gradation, and chemical quality prior to delivery to the job site.

## 6.0 DOCUMENTATION AND REPORTING

The Contractor will be responsible for *quality control* during construction. The Project Engineer will be responsible for *quality assurance* (i.e., to verify that the required quality control measures have been implemented). Table 2 summarizes submittals required of the Contractor prior to, during, and at the completion of different construction tasks. Additional details are provided in the contract Specifications.

### *6.1 Pre-Construction Documentation*

Prior to beginning work on the project, the Contractor will be required to submit a Remedial Action Work Plan by December 3, 2002, for approval by the City and EPA. The Remedial Action Work Plan will contain the following elements:

- Project Work Plan;

- Contractor Quality Control Plan;
- Contractor Site-Specific Remedial Action Health and Safety Plan;
- Contractor Environmental Protection Plan; and
- Settlement Monitoring Plan.

EPA's approval authority for these plans is defined in the UAO for the remedial action. Construction QA/QC procedures will be addressed in various elements of the Remedial Action Work Plan. A brief description of the contents of each component of the Remedial Action Work Plan is provided below.

### 6.1.1 Project Work Plan

The Project Work Plan will describe, in narrative form, the methods to be employed in the remedial action including equipment types, modes of operation, sequence of activities, and other aspects necessary to describe how and when the specified work will be performed. A detailed construction schedule must be included in the Project Work Plan to satisfy requirements of the SOW. This Project Work Plan is required as part of the Remedial Action Work Plan.

### 6.1.2 Contractor Quality Control (CQC) Plan

The CQC Plan will present the system through which the Contractor assures that construction activities are being implemented in compliance with the requirements of the contract. The CQC Plan will identify personnel, procedures, methods, instructions, inspections, records, and forms to be used in the CQC system. Specifically, the CQC Plan will include a description of procedures for maintaining and updating activity logs, procedures for reporting emergencies or out-of-spec conditions, recordkeeping procedures for personnel, equipment maintenance and calibration, and daily and weekly reporting requirements. The CQC Plan will be submitted to the City for approval. This plan must also be reviewed and accepted by the EPA, and other state and local agencies, as appropriate.

The CQC will include as an appendix, a Sediment Verification Sampling Field Sampling Plan/Quality Assurance Protection Plan (FSP/QAPP). The Sediment Verification FSP/QAPP will describe the specific methods and procedures that will be used by the Contractor (or subcontractor) to collect and analyze sediment verification samples during construction to ensure that the final remedy complies with SQOs. At a minimum, this plan will include a description of field sampling equipment, verification sampling locations, sediment sampling and processing procedures, sample handling and chain of custody, analytical

methods, laboratory quality control limits, and other quality assurance procedures.

### 6.1.3 Remedial Action Health and Safety Plan (HASP)

The Contractor will submit its HASP presenting the minimum health and safety requirements for job site activities, and the measures and procedures to be employed for protection of on-site personnel. The Contractor will employ a Certified Industrial Hygienist (CIH) to produce this plan. The plan will cover the controls, work practices, personal protective equipment (PPE), and other health and safety requirements that will be implemented by the Contractor in connection with the remedial action construction activities. The Contractor will be required to submit the HASP to the City for approval. This plan must also be reviewed by the EPA and other appropriate state and local agencies, as appropriate.

### 6.1.4 Environmental Protection Plan

For all construction activities, the Contractor will be required to submit an Environmental Protection Plan to the City for approval. This plan must also be reviewed and accepted by the EPA, and other state and local agencies, as appropriate. The plan will cover potential environmental releases as a result of the Contractor's operations, as well as monitoring and corrective actions necessary to control such releases. The plan will contain separate sections addressing contaminant prevention, containment, and cleanup; erosion and turbidity control; sound level control; air pollution and dust control; and water quality monitoring as they pertain to the following construction activities:

- Pier/piling demolition and disposal;
- Installation of slope stability structures (including sheet pile walls);
- Removal and disposal of debris; and
- In-water capping.

The Environmental Protection Plan will include a Water Quality Monitoring FSP/QAPP. The Water Quality Monitoring FSP/QAPP will describe the specific methods and procedures to be used by the Contractor (or subcontractor) to collect and analyze surface water samples during construction to ensure compliance with State Water Quality Standards. At a minimum, the plan will include a description of field equipment, calibration and maintenance documentation for the field equipment, monitoring locations and frequencies, sampling and monitoring procedures, sample handling and documentation, equipment calibration and maintenance procedures, analytical methods,

laboratory quality control limits, personnel qualifications, and quality assurance procedures.

### 6.1.5 Settlement Monitoring Plan

The Contractor will submit a Settlement Monitoring Plan that describes specific procedures, personnel, and recordkeeping methods for installing settlement monitoring equipment and for monitoring settlements (and lateral movements) on existing structures at the Martinac Shipbuilding facility within the Thea Foss Waterway, at Johnny's Seafood near the 15th Street ROW, and at the Wheeler-Osgood Building on the north side of the waterway at approximate Station 12+50. The intent of this monitoring is to ensure that adjacent structures do not undergo excessive movement resulting in structural damage associated with earthwork and sheet pile installation activities. The Contractor will be required to submit the Settlement Monitoring Plan to the City for approval. This plan must also be reviewed by the EPA and other state and local agencies, as appropriate.

## *6.2 Construction Documentation*

During construction activities, the Contractor will be required to submit daily and weekly reports to the City and EPA. These submittals are for information purposes only and are intended to summarize daily and weekly work conditions, deviations, and corrective measures, as described below. A brief description of the contents of each of the reports is provided below.

### 6.2.1 Daily Quality Control Report

During construction activities, the Contractor shall prepare a Daily Quality Control Report and submit it to the Project Engineer. The reports will summarize the work performed by the Contractor, the equipment used, and the results of any quality control inspections, tests, or other monitoring activities. The reports will also document any noncompliant conditions, communication of such conditions to the Project Engineer, and corrective actions taken to bring the construction activity into compliance. Daily Reports that reveal an out-of-spec condition or changed conditions will be faxed to EPA no later than the next business day.

### 6.2.2 Weekly Quality Assurance Report

The Project Engineer will prepare a Quality Assurance Report on a weekly basis and submit it to EPA. An example report form is provided on Figure 2. The

Quality Assurance Report will include a detailed description of construction events, as well as any delays and their causes/remedies. The report will describe the results of the Project Engineer's quality assurance inspections, testing, surveying, and monitoring activities, and the effectiveness of the Contractor's quality control activities. The Contractor's Daily Quality Control Reports will be provided weekly to EPA with the Quality Assurance Report. In the event that QA inspections reveal an out-of-spec condition, the Daily Quality Control Report will be faxed to EPA no later than the next business day (see below). Where QA inspections utilize the results of the Contractor's surveys and tests, these results will be summarized and included in the Quality Assurance Report.

If QA inspections reveal out-of-spec conditions, the Project Engineer will immediately contact the Superintendent to determine what action will be taken to modify the construction operation and correct the condition. If warranted, this initial contact will be followed up with a written memo to the Superintendent confirming any oral instructions given. Instructions to the Contractor for any work that deviates from the Specifications will be confirmed with the Contractor in writing. The results of these discussions and follow-up corrective actions will be included in the weekly Quality Assurance Report.

The Project Engineer will meet weekly with the EPA Project Monitor to review the weekly Quality Assurance Report and to keep the EPA Project Monitor informed of continuing events as the remediation work proceeds. Any work not in accordance with the EPA-approved remedial design Plans, Specifications, work plans, and/or documents will be brought to the immediate attention of EPA. Any changes to EPA-approved documents must first have EPA approval before being implemented.

In the event that a change or changed condition is encountered, as defined in the contract documents, the Project Engineer and the City (or their designated consultant) will review the condition and jointly make a determination as to what revision in the construction activity or construction product will be required, consistent with the intent of the design documents. EPA will be involved in the review and revision if the change is significant in its impact. The weekly meeting between the Project Engineer and EPA's Project Monitor is the proposed forum to discuss any changes in construction activities or construction products.

## 7.0 REMEDIAL ACTION CONSTRUCTION ELEMENTS

The Contractor will be required to perform the following remedial action construction elements:

- Demolition/removal of pilings and debris;
- Installation of a sheet pile wall;
- Channel and slope capping (including installation of grouted slope mats) in Thea Foss and Wheeler-Osgood Waterways.

Project work will be conducted in strict accordance with the contract Plans and Specifications, including the implementation of QA/QC procedures specified therein, as necessary to build a successful remedy. Included below for each of these work elements is a summary of the following items:

- **Task Description.** Description of the remedial action task, the equipment, and general procedures that will be utilized to accomplish the activity;

- **Potential Concerns and Quality Control Measures.** Description and evaluation of potential construction concerns; measurements, procedures, or inspections to verify compliance with Plans and Specifications; and anticipated remedies to correct QC deviations; and

- **Environmental Monitoring and Corrective Actions.** Environmental monitoring tasks to be performed during remedial construction activities; required field and/or laboratory tests and analyses, monitoring schedules and durations; and environmental compliance criteria and corrective actions to be implemented in the event of noncompliance.

## *7.1 Demolition/Removal of Pilings*

### 7.1.1 Task Description

This task involves the removal and disposal of the timber pilings from the Department of Natural Resource (DNR) land on the St. Paul/Middle Waterway Peninsula, and portions of the Thea Foss and Wheeler-Osgood Waterways remedial areas (RAs 3, 10, 11, and 13). Piles will be removed by pulling. This task also involves the demolition of the existing timber structure in the Wheeler-Osgood Waterway. The Contractor will likely use a derrick and barge to remove the pilings. Upland equipment, such as a trackhoe, may be used to demolish the existing structures as well as pilings closest to shore.

In addition, since the Contractor will more than likely use water-based equipment to remove the piling, an off-loading and materials handling area will be procured by the Contractor to transfer the timbers from the barges to trucks (or rail) for disposal. Similar to the City's Olympic View Resource Area (OVRA) project conducted earlier this summer, the timber piling could be segregated

into treated and untreated piling. Treated timbers would be disposed of at a regional landfill for problem wastes and untreated timbers could be recycled by the contractor.

### 7.1.2 Potential Concerns and Quality Control Measures

The primary concern is inadequate removal of pilings during demolition. The Contractor will be required to survey and locate all pilings and structures prior to removal, and to present this on an as-built drawing. After piling removal, the Contractor will note which piles were unable to be fully removed (i.e., due to breakage), and the elevation of the top of any remaining piles.

### 7.1.3 Environmental Monitoring and Corrective Actions

Potential environmental concerns include releases of debris, petroleum hydrocarbons, dust, or hazardous materials to the water column during demolition of pilings or structures. Control measures to prevent such releases will be outlined in the Environmental Protection Plan and the Remedial Action HASP, as appropriate.

The Contractor will be required to employ an oil containment boom during piling removal to capture any petroleum, creosote, or other oily materials. This boom will also collect any floating debris that may be released during piling removal. The Contractor will be required to maintain a supply of oil absorbent pads and snares on the barge to be employed if visible contamination is observed.

## *7.2 Installation of Sheet Pile Retaining Wall*

### 7.2.1 Task Description

This task involves the installation of the 280-foot-long, sheet pile retaining wall along the bank of Johnny's Seafood site within RA 8 of the Thea Foss Waterway, as shown on the Plans. The Contractor will likely use a vibratory driver for installation of sheet piling.

### 7.2.2 Potential Concerns and Quality Control Measures

Potential concerns include improper placement of the sheet pile wall and obstructions to sheet pile penetration.

**Placement Confirmation.** The Contractor will be required to survey the sheet pile wall and to present its location on as-built drawings.

**Obstructions to Sheet Pile Penetration.** If sheet piles driven on land or bank areas meet refusal before they reach their design embedment depth, the Contractor will pull out the sheet pile element(s) that met the obstruction. Based on the depth of refusal, the Contractor will either excavate the obstruction until it is removed, or adjust the alignment of the affected sheet pile element(s), based on the approval of the City and the Project Engineer, until the obstruction is bypassed and the sheet pile is installed to the full design depth.

### 7.2.3 Environmental Monitoring and Corrective Actions

Since the sheet piles will be installed above the mean higher high water level, direct sediment resuspension is not an environmental concern. However, minor raveling of slopes above the waterline into the water and the subsequent suspension of sediment or oily material is a potential environmental concern during pile driving. Noise pollution to the surrounding community is also an environmental concern.

The Contractor will be required to install, cut, and remove the sheet piles in a manner that will minimize the disturbance of surrounding sediment. The Contractor will be required to maintain a supply of oil booms, oil absorbent pads, and snares on the barge or upland pile driving equipment to be employed if visible contamination is observed. These contingency measures will be outlined in the Environmental Protection Plan.

To control noise pollution, pile driving in the Thea Foss Waterway will be limited to the hours between 7:00 a.m. and 6:00 p.m., Monday through Friday; no pile installation will occur on the weekends.

### 7.2.4 Documentation

The Contractor will include pile driving results from the day's measurements with the Daily QC Reports that are submitted to the Project Engineer. The Contractor will also submit a final as-built drawing and supporting documentation noting any corrective actions taken during the project to the Project Engineer and EPA.

## *7.3 Channel and Slope Capping in the Thea Foss and Wheeler-Osgood Waterways*

### 7.3.1 Task Description

This task involves the capping of contaminated sediments in portions of the Thea Foss Waterway and capping in the Wheeler-Osgood Waterway for slope remediation as well as rehabilitation purposes. Caps will be applied to both slope and channel areas. Capping equipment will likely consist of either a skip box and derrick, or clamshell bucket and derrick, for open-water and open-bank placement, and a scow barge and hydraulic system for under-pier placement.

**Thea Foss Waterway.** A channel cap will be constructed over sediments in open water in RA 1A. The channel cap will be constructed with a minimum of 3 feet of sandy material. A minimum 3-foot-thick slope cap, consisting of filter material overlain by riprap, will be placed on the slopes in RA 1B. Above elevation -10 feet MLLW, "habitat mix" will be placed to fill the interstices in the riprapped slopes to improve the habitat quality of the substrate.

Due to the oversteepened slopes containing slag debris on the slope of RA 3 and the need to maintain draft requirements at the Totem Marine Services facility, a specialized cap will be required for a portion of the area. The specialized cap will be comprised of multiple layers of articulated grout-filled mats that will conform to the existing slope and provide the necessary chemical and physical isolation. The specialized cap will be placed only where necessary, while the remainder of the slopes in RA 3 will be capped with the typical 3-foot-thick slope cap described above.

A flat slope cap will be constructed under the pier structures at the Martinac Shipbuilding Pier facility in RA 14. A minimum 3-foot-thick slope cap, consisting of filter material overlain by quarry spalls, will be placed on the slope above elevation 2 feet MLLW. Habitat mix will be placed in the interstices of the armored slope to improve the habitat quality of the substrate. Debris piles located beneath the pier structures will be removed and disposed of prior to capping activities at an EPA-approved facility in accordance with the project Specifications.

**Wheeler-Osgood Waterway.** The slopes of the RA 10, RA 11, and RA 13 in the Wheeler-Osgood Waterway are slated for slope rehabilitation. SQO exceedances were not identified in the existing sediments in RA 10 and RA 11. RA 13 was determined suitable for natural recovery due to low enrichment ratios for the sediments. The over-steepened portions of these slopes will be capped with a 2-foot-thick layer of quarry spalls and underlying filter aggregate.

Above elevation -10 feet MLLW, "habitat mix" will be placed to fill the interstices in the armored slopes to improve the habitat quality of the substrate.

Capping will be performed in accordance with the Project Work Plan, which will be prepared by the Contractor and approved by EPA and the City.

### 7.3.2 Potential Concerns and Quality Control Measures

The main concerns in the capping process include the following as described below:

- **Cap Thickness and Extent.** Ensuring that the capping material is satisfactorily placed over the required areas and to the required thicknesses;
- **Import Material Quality.** Verifying that the chemical and physical characteristics of the capping material are appropriate for their intended use;
- **Cap Verification Sampling.** Verifying that the cap has not been cross-contaminated by the underlying sediments during placement; and
- **Impacts to Adjacent Structures.** Avoiding impact to structures, primarily settlement, in and adjacent to the waterway as a result of cap placement.

#### *7.3.2.1 Cap Thickness and Extent*

**Overcap Allowance.** To ensure that adequate cap thickness is achieved where *in situ* sediments exhibit SQO exceedances, the contract will mandate placement of a minimum capped thickness of 3 feet, with allowance for up to 1 foot of additional material. Caps will be placed in two lifts, each lift being at least 18 inches thick. For portions of RA 3 that will require a specialized cap, the cap thickness will be less than 3 feet, but the requirements for chemical and physical isolation will be met due to the nature of the material comprising the cap. No overcap allowance is specified for the specialized cap. In the Wheel-Osgood Waterway, where capping will be performed for slope rehabilitation purposes only and not for containment of contaminated sediments, a minimum cap thickness of 2 feet is specified, with allowance for up to 6 inches of additional material.

**Cap Coring.** Cores will be collected on a systematic grid to verify cap thickness in channel areas. After final placement, cores will be collected on 200-foot centers in the capped channel area of RA 1A as shown on Figure 3 (two cores total). The cores will be collected using a method that minimizes compaction, such as a vibracorer or impact corer; a gravity corer will not be used. The cores will be driven to 5 feet, and the cap thickness will be logged in each core. If the

cap is too thin, the Contractor will be required to place additional material to achieve the minimum thickness of 3 feet.

**Cap Placement Equipment Controls.** To accurately locate and track the movement of the cap placement equipment, the Contractor will be required to employ a sonar sounding device and electronic positioning system (EPS) on the equipment. The control requirements for this system will comply with the minimum performance standards for Navigation and Dredging Support Surveys, as specified in the U.S. Army Corps of Engineers manual EM 1110-2-1003 (Corps 2002; Table 3-1).

The Project Engineer will work closely with the Contractor's Quality Control Manager and hydrographic survey crew to independently verify the horizontal position and delivery volumes of the cap placement equipment. This may be done by evaluating the Contractor's QC surveys and/or positioning data, conducting independent surveys, or a combination of both methods. If the Project Engineer determines that the Contractor is not placing cap materials in the correct location, the Superintendent will be contacted to correct the situation. Any such direction and corrective action will be documented in the next Quality Assurance Report.

**Hydrographic Surveys.** Contractor Quality Control hydrographic surveys will be performed before and after each lift of capping materials is placed, to establish the cap thicknesses and extent. Survey equipment will be maintained and calibrated for the life of the contract. Maintenance and calibration procedures will be prescribed in the CQC Plan to ensure that the equipment performs to the accuracy required by the specified order of survey.

The Contractor will perform pre-cap and post-cap hydrographic surveys; these surveys will be used to establish compliance with the Plans, and to serve as the basis for payment.

The surveys will be performed using an EPS and a single-beam, dual frequency or multi-beam, single-frequency echosounder system. If a single-beam system is used, the trackline spacing will be no greater than 25 feet to minimize interpolation error. The survey control requirements will comply with the minimum performance standards for Navigation and Dredging Support Surveys, as specified in the U.S. Army Corps of Engineers manual EM 1110-2-1003 (Corps 2002; Table 3-1). An automatic electronic tide recording system is also required for dredging and surveying operations. In addition, tide boards or gages will be installed at the site.

### *7.3.2.2 Import Material Quality*

Potential import material used in the construction of the cap may include:

- Imported material from quarries; and/or
- Clean dredged material from adjacent areas.

Prior to the use of any imported material, its physical and chemical characteristics will be determined, as discussed below.

Prior to the use of any imported material, the Contractor will analyze a representative sample(s) of the material for the following properties and constituents:

- Grain Size Distribution (ASTM D 422-63);
- Total Organic Carbon (EPA Method 9060);
- Modified Proctor (ASTM D 1557-78/D 698-78);
- Priority Pollutant Metals;
- Volatile Organic Compounds (EPA Method 8240);
- Semivolatile Organic Compounds (EPA Method 8270); and
- PCBs and Pesticides (EPA Method 8080).

For upland sources (i.e., quarries), a representative composite sample consisting of five or more subsamples of the source material will be analyzed. For aquatic sources (i.e., sediments), a representative sample(s) should be obtained consistent with the requirements of the Puget Sound Dredged Disposal Analysis (PSDDA) program (Corps et al. 2000). Existing analytical data from Pre-Remedial Design, PSDDA, or other investigations may be used to characterize the import material.

Before characterizing sediment borrow sources, per PSDDA requirements, the Contractor will provide a sampling and analysis plan, Import Material Characterization FSP/QAPP, to be submitted as a supplement to the CQC Plan. Before characterizing an upland borrow source, the Contractor will provide a map documenting the origin of the material, and conduct a site inspection to ensure that the material will uniformly meet the physical specifications of its intended use.

Chemical concentrations in the imported material must be below the SQOs.

### *7.3.2.3 Cap Verification Sampling*

**Verification of Sediment Quality on Cap Surface.** Verification samples will be collected after the placement of the final lift of capping material in RA 1A to ensure that the cap is not cross-contaminated during placement. Two surface sediment samples will be collected on 200-foot centers, as shown on Figure 3.

Based on analytical data collected during Pre-Remedial Design (City of Tacoma 1995, 1997, and 1999), sediment verification samples will be analyzed for the following chemical parameters:

- Target Metals (mercury, lead, zinc, copper, and arsenic);
- Semivolatile Organic Compounds (SQO List);
- DDT compounds;
- Polychlorinated biphenyls (PCBs); and
- Total Organic Carbon.

The laboratory methods and QA/QC procedures used to analyze the sediment samples will be consistent with those presented in Appendix A - Sediment Sampling Operations Manual, and will meet or exceed the Data Quality Objectives (DQOs) set forth in Appendix A. In conformance with these methods and procedures, the Contractor will provide the following information in the Sediment Verification Sampling FSP/QAPP:

- Data Quality Objectives (DQOs);
- Sample collection and handling procedures;
- Analytical methods;
- Detection limits;
- Types and frequencies of QA/QC samples; and
- Laboratory control limits.

The concentrations of constituents in the cap surface must not exceed the SQOs. The Contractor should conduct his operations to reduce the disturbance and resuspension of underlying sediments. This may include limiting the fall distance of cap material through the water column, or slowing the placement rate.

**Verification of Sediment Quality at Cap Boundaries.** Verification samples will be collected along the boundaries of the open-channel and slope caps in RA 1A/1B and RA 3 after placement of the final lift. These samples will be collected about 50 feet outside of the cap boundary to monitor for contamination that may have been pushed aside during placement. Four samples will be collected

at the cap boundaries, as shown on Figure 3. Cap verification sampling will not be required at RA 10/11/13, or RA 14 because the channel areas adjacent to these caps will be dredged in a subsequent remedial action.

Cap boundary verification samples will be analyzed for the chemicals listed above. These samples must not exceed the SQOs.

**Corrective Action.** If the cap material exceeds SQOs at any location after final placement, either on the surface or along the cap boundaries, additional capping material may need to be placed to comply with SQOs. This may include adding thin layers (i.e., 6-inch lifts) to the surface, and/or extending the cap edge laterally. However, placement of additional cap material must not compromise the navigational requirements of the waterway. For this reason, all practical measures to reduce resuspension must be implemented to prevent cross-contamination of the final surface.

#### *7.3.2.4 Impacts on Adjacent Structures*

Prior to the start of construction activities, the Contractor will submit a Settlement Monitoring Plan. This plan will identify the personnel, procedures, methods, and documentation required to monitor the movement of waterside structures as a result of construction activities.

Capping activities will take place on the existing waterway side slopes at the Martinac Shipbuilding Pier facility and the Wheeler-Osgood Waterway Building. These facilities include a number of existing pile-supported waterside structures. Placement of capping materials on the slope could potentially induce settlement of underlying sediments and thereby create downdrag on existing piles. The Contractor will install survey points at specified locations on the Martinac Pier and Wheeler-Osgood Building to monitor for induced settlement.

In addition, installation of the sheet pile bulkhead along the top of bank at Johnny's Seafood could potentially impact the adjacent building. The Contractor will install survey points at specified locations on the building to monitor potential impacts during pile driving.

A pair of baseline surveys will be conducted to establish conditions prior to capping and pile driving. In addition, a structural condition survey will be performed on these structures to document their structural condition prior to commencing work.

Settlement monitoring will begin once capping or pile driving work begins within 100 feet of the structures. During the duration of time that the work takes place within this radius, monitoring will be done on an essentially constant basis, with each monitoring point surveyed each day. For capping areas, once the work event is complete within the specified radius, surveying will continue on a daily basis for three days, and on a weekly basis for two more weeks thereafter, so that slowly developing movements can be documented. All survey results will be transmitted to the Project Engineer immediately after each survey event.

If at any point a survey indicates that a cumulative total movement in excess of 1 inch has occurred anywhere on a structure, the Project Engineer will be notified and work stopped until the Project Engineer provides further instruction. This may involve revisions to the cap design or the partial removal of placed cap material.

### 7.3.3 Environmental Monitoring and Corrective Actions

The Contractor will be required to conduct water quality monitoring during capping to control water quality impacts caused by resuspension of imported and *in situ* sediments. The Contractor will monitor water quality parameters at specified sampling frequencies, locations, and depths, as described in this section. Water quality will be evaluated for compliance with Washington State Water Quality Standards (Chapter 173-201A WAC). The Contractor must also comply with the Section 401 Water Quality Certification for this project, to be issued by EPA, which may contain provisions in addition to those listed herein. If the provisions of the Water Quality Certification conflict with any provisions presented in this CQAP or the project specifications, the Water Quality Certification shall take precedence.

The Contractor will prepare a Water Quality Monitoring FSP/QAPP as an appendix to the Environmental Protection Plan, to be submitted prior to the start of construction, for approval by EPA and the City. The Water Quality Monitoring FSP/QAPP will describe field and laboratory sampling, analysis, and quality control procedures for monitoring short-term water quality impacts from capping, debris removal, pile removal, and other construction activities. The Environmental Protection Plan will discuss engineering and operational procedures, or other best management practices (BMPs), that will be employed to minimize sediment resuspension during construction.

### *7.3.3.1 Purpose and Objectives*

The purpose of the water quality monitoring program is to provide ongoing assessment of the water quality impacts during construction activities. The specific objectives of the monitoring program are:

- Ensure that water quality parameters (turbidity, total suspended solids [TSS], temperature, and dissolved oxygen) remain within acceptable limits;
- Implement appropriate modifications to construction operations, if necessary, based on feedback from the monitoring program, in a manner that minimizes impacts to the receiving water; and
- Document the results of the water quality monitoring program.

### *7.3.3.2 Monitoring Parameters and Compliance Criteria*

The Environmental Protection Specification (Section 01120) is designed to fulfill the substantive requirements of the Clean Water Act Section 401 water quality compliance certification. The Clean Water Act (CWA) was identified as an Applicable or Relevant and Appropriate Requirement (ARAR) in the ROD. Consistent with these requirements, the Contractor will ensure that construction activities comply with the Water Quality Standards for Surface Waters of the State of Washington (Chapter 173-201A WAC), the delegated state regulation for implementing CWA provisions, and the specific requirements of the Water Quality Certification issued by EPA for this project. The Contractor is also responsible for documenting ambient "background" water quality prior to and during construction.

**Water Quality Parameters.** Water quality monitoring for conventional parameters will be performed during all monitoring events. Controlling turbidity and TSS during construction activities will implicitly control the release of chemical contaminants during capping and other in-water construction activities. Specifically, the Contractor will monitor the following conventional parameters:

- Turbidity;
- TSS;
- Temperature; and
- Dissolved Oxygen (DO).

According to the WAC, different remediation areas within the project site are defined as Class B or C waters, as follows:

- Class B (Inner Commencement Bay): includes RA 1A/1B, RA 3, and the Middle/St. Paul Peninsula;
- Class C ("City" Waterway): includes all other remediation areas south of the 11th Street Bridge.

Table 3 lists the water quality criteria for these parameters in Class B and C waters that will be applied to their corresponding remediation areas.

#### *7.3.3.3 Monitoring Locations*

**Ambient Monitoring Locations.** Before construction and during construction, but outside the influence of construction activities, the Contractor will monitor ambient water quality conditions. Temperature and turbidity criteria are based on comparisons to background conditions; therefore, background conditions must be established at the onset of construction, and continually monitored during construction.

The Contractor will perform a pre-construction survey of ambient water quality conditions in the vicinity of the construction site to establish background values for water quality parameters. The ambient monitoring program will include the following (see also Sheet C-3 of the Plans):

- Sampling of four ambient monitoring stations, including three stations within Thea Foss Waterway (Stations 2+00, 30+00, and 60+00), and one station at the mouth of St. Paul Waterway (St. Paul Station 7+00);
- Three rounds of monitoring at each station, separated by at least 24 hours;
- Sampling of three tidal phases (ebb, slack, and flood tides) during each monitoring round;
- A total of 36 ambient water quality measurements will be collected (four stations x three rounds x three tidal phases); and
- If possible, at least one round of monitoring should be conducted during or after a significant rainfall event.

Background values for water quality parameters will be calculated based on the 90th percentile of the data. The monitoring results, and the calculated 90th percentile background values, will be submitted in the Ambient Water Quality Monitoring Report two weeks prior to the initiation of construction activities. Ambient water quality will continue to be monitored at bayward station (Thea Foss Station 2+00, St. Paul Station 7+00 or other City and EPA-approved location) during construction. One of these two background stations (i.e., the station farthest from the active construction area) will be monitoring during each

round of construction monitoring. Background values will be recalculated monthly, based on updated monitoring results.

**Compliance Boundaries.** Compliance boundaries will be established for all construction activities with a radial 300-foot mixing zone and a 150-foot "early warning" zone at the mid-point of the mixing zone. The compliance boundaries will be centered around the construction activity and will migrate with the construction activity. If more than one construction activity is taking place in close proximity, such that the mixing zones for the activities overlap, the construction zone may be treated as one contiguous area for monitoring purposes. In such cases, EPA should be consulted to determine how best to modify the compliance boundaries and monitoring stations.

**Compliance Monitoring Locations.** Water quality will be monitored at a total of four locations around each construction activity, as shown on Sheet C-3 of the Plans. Three monitoring locations will be situated on the compliance boundary 300 feet from the construction activity. Two of the locations will be on ebb tide side of the compliance boundary, and the third location will be on the flood tide side of the boundary. A fourth monitoring location will be situated at the mid-point of the mixing zone in the ebb tide direction, as an "early warning" location and to monitor dissolved oxygen within the mixing zone. One of the ambient background locations will also be monitored during each round of measurements, as described above.

The exact monitoring locations may move laterally along the compliance boundary and the "early warning" boundary. Monitoring locations will be positioned to intercept any visible turbidity plumes emanating from construction activities.

**Monitoring Depths.** At each monitoring location, water quality parameters will be measured at three depths—shallow (within 3 feet of water surface), intermediate (approximate mid-point of the water column), and deep (within 6 feet of the sea floor). The three measurements will be combined into a single depth-averaged value at each location to evaluate compliance with water quality criteria.

TSS data will be collected for discrete samples from the mid-point of the water column.

### *7.3.3.4 Monitoring Schedule and Reporting*

**Conventional Parameters.** Water quality parameters will be measured *in situ* in the water column for real-time feedback to the Contractor (except TSS, see below). Water quality monitoring for conventional parameters will be performed according to three schedules:

- Intensive Monitoring (twice per 8-hour or 12-hour shift);
- Routine Monitoring (once daily); and
- Limited Monitoring (once weekly).

TSS samples will be collected along with other conventional parameters. TSS analyses will be performed at a local or on-site laboratory on an accelerated 24-hour turnaround.

Monitoring will be preferentially scheduled during ebb tide conditions when the waterways are discharging to Commencement Bay.

The Environmental Protection Specification defines each of the monitoring schedules. Activities potentially involving the disturbance of contaminated sediments (i.e., capping) will begin with an Intensive Monitoring schedule. Following a specified period of time with no exceedances of water quality criteria, the monitoring program may revert to a less frequent schedule.

Results of the water quality monitoring activities will be submitted to the City as part of the Daily Quality Control Report and summarized weekly in the Quality Assurance Report.

### *7.3.3.5 Corrective Action*

**Stop Work.** Construction activities will cease at the first indication of the following conditions in the construction area:

- An observable oil sheen; or
- Distressed or dying fish.

The Project Engineer or his on-site designee will have authority to issue Stop Work orders if and when such conditions are observed.

**Modify Operations.** If an exceedance of a water quality criterion occurs at the compliance boundary, the Contractor will be required to modify construction operations to alleviate the water quality impacts. Such modifications may

include improved best management practices (BMPs), such as capping during appropriate tidal windows, revised placement methods, or implementing additional engineering controls. EPA will be notified of the noncompliant situation within four business hours from the time the exceedance is determined, and of the corrective actions that are being implemented. The exceedance will trigger Intensive Monitoring, and EPA will be kept apprised of ongoing monitoring results. If water quality conditions do not improve, the Project Engineer will consult with EPA to determine what additional actions may be necessary.

## 8.0 REFERENCES


City of Tacoma 1995. Round 1 Data Evaluation and Pre-Design Evaluation Report. Thea-Foss and Wheeler Osgood Waterways. May 30, 1995.

City of Tacoma 1997. Round 2 Data Evaluation and Pre-Design Evaluation Report. Thea-Foss and Wheeler Osgood Waterways.

City of Tacoma 1999. Round 3 Data Evaluation and Pre-Design Evaluation Report. Thea-Foss and Wheeler Osgood Waterways.

Corps 2002. Engineering and Design - Hydrographic Surveying. EM 1110-2-1003. January 2002.

Corps et al. 2000. U.S. Army Corps of Engineers, EPA-Region 10, Washington State Departments of Natural Resources and Ecology, Dredged Material Evaluation and Disposal Procedures - User's Manual, February 2000.

EPA 1989. Commencement Bay Nearshore/Tideflats Record of Decision. USEPA Region 10. September 1989.

EPA 2002. Statement of Work for 2002 Remedial Action under Unilateral Administrative Order, September 12, 2002.


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## Table 1 - Summary of Construction Monitoring and Testing Requirements



| Construction Element* | Monitoring Requirement | Monitoring Frequency |
|---|---|---|
| **DIVISION 1: GENERAL REQUIREMENTS** | | |
| **Environmental Protection - Section 01120** | *Part 3.01 Inspection of Environmental Protection Equipment* | Monthly |
| | *Part 3.07 Water Quality Monitoring* | |
| | 1. Ambient Water Quality Survey | Prior to beginning any work |
| | 2. Water Quality Monitoring | Intensive, Routine, and Limited Schedules; All in-water work |
| | 3. Presence of Oily Sediments | Continuous During Construction |
| | 4. Presence of Distressed or Dying Fish | Continuous During Construction |
| **Quality Control - Section 01400** | *Part 3.01D Contractor Quality Control - Inspections* | |
| | 1. Preparatory Inspection | Prior to beginning any work |
| | 2. Condition Surveys | Before work and at completion of work involving waterside structures |
| | 3. Initial Inspection | *Representative portion of work complete* |
| | 4. Follow-up Inspections | Daily |
| | 5. Agency Pre-Final and Final Inspections (see Section 01700) | Completion of work or any increment established in the NTP |
| | *Part 3.02 Surveys and Survey Control* | |
| | 1. Hydrographic Surveys - Compliance/Payment | Pre-Cap and Post-Cap |
| | *Part 3.03 Sediment Verification* | |
| | 1. Cap Surface Verification Sampling | After placement of the capping material |
| | 2. Cap Boundary Surface Verification Sampling | After placement of the capping material. |
| | 3. Cap Thickness Verification Coring | After placement of the capping material. |
| **Project Closeout - Section 01700** | *Part 3.02 Agency Pre-Final and Final Inspections* | Completion of work or any increment established in the NTP |
| **DIVISION 2: SITE WORK** | | |
| **Capping - Section 02215** | *Part 2.02 Borrow Source Characterization* | |
| | 1. Physical and Chemical Testing | 2 weeks prior to on-site placement |
| | 2. Inspection of Borrow Source | Prior to on-site placement |
| | 3. Inspection of Import Materials Delivered to Jobsite | Each truckload/bargeload, upon delivery |
| **Piling - Section 02360** | *Part 1.03 Quality Assurance* | |
| | 1. Inspection of Pile Driving | Continuous during installation |
| **DIVISION 3: CONCRETE** | | |
| **Cast-in-Place Concrete - Section 03300** | *Part 3.08 Testing* | |
| | 1. Testing and Inspection of Concrete Materials | *As necessary by Contractor to assure specified quality,* or As necessary when changes in material, proportions, or procedures are requested by Contractor. Otherwise testing will be completed by the City of Tacoma. |

## Table 1 - Summary of Construction Monitoring and Testing Requirements



| Construction Element* | Monitoring Requirement | Monitoring Frequency |
|---|---|---|
| **Grouted Slope Mats - Section 03371** | *Part 3.03 Testing*<br>1. Testing and Inspection of Grout Materials | As necessary by Contractor to assure specified quality,<br>or as necessary when changes in material, proportions, or procedures are requested by Contractor. Otherwise testing will be completed by the City of Tacoma. |
| **DIVISION 13: SPECIAL CONSTRUCTION**<br>**Settlement Monitoring - Section 13300** | *Part 3.02 Settlement Monitoring of Adjacent Structures*<br>1. Marinac Shipbuilding Facility<br>2. Johnny's Seafood Building<br>3. Wheeler-Osgood Waterway Building | Two initial "baseline" surveys; then daily during work in area.<br>At completion of work in the capping area, once per day for 3 days, then once per week for 2 weeks. |

**Note:**
*This table summarizes only those Divisions of the Final Design Specifications that are most relevant to the Construction Quality Assurance Plan.
The Final Design Specifications should be consulted for a complete list of monitoring, inspection, testing, sampling, and analytical requirements.

## Table 2 - List of Submittals for Contractors



| Construction Element [a] | Submittal |
|---|---|
| **DIVISION 0: BIDDING AND CONTRACT DOCUMENTS** | |
| **Instruction to Bidders - Section 00200** | Part 1.03 Bid Bond<br>Part 1.04 Bid Form<br>Part 1.05 Contractor Qualification Statement<br>Part 1.09 HUB and LEAP Proposal Form<br>Part 1.10 Non-Collusion Affidavit<br>Part 1.11 *Project Work Plan* |
| **DIVISION 1: GENERAL REQUIREMENTS** | |
| **Summary of Work - Section 01010** | Part 1.14 **Remedial Action Work Plan** [b] |
| **Project Coordination - Section 01040** | Part 3.03 Vessel Management Plan |
| **Site Health & Safety - Section 01100** | Part 3.02 **Remedial Action Health and Safety Plan (HASP)**<br>1. **CIH Certification and Resume** (Part 3.01)<br>Part 3.03 Health and Safety Training Program<br>Part 3.03 Health and Safety Awareness Program |
| **Environmental Protection - Section 01120** | Part 3.01 **Environmental Protection Plan**<br>1. **Water Quality Monitoring FSP/QAPP** (Part 3.07)<br>Part 3.01 Monthly Equipment Inspection Reports<br>Part 3.07 *Ambient Water Quality Monitoring Report*<br>Part 3.07 *Weekly Water Quality Reports* |
| **Project Meetings - Section 01200** | Part 3.02 Corrections to Project Mtg Minutes (if necessary) |
| **Project Schedule - Section 01320** | Parts 3.03 and 3.04 **Project Schedule**<br>1. **Personnel Qualifications** (Part 1.04)<br>Parts 3.03 and 3.04 Periodic Schedule Updates |
| **Quality Control - Section 01400** | Part 3.01 **Construction Quality Control (CQC) Plan**<br>1. **Sediment Verification Sampling FSP/QAPP** (Part 3.03)<br>Part 3.01 *Daily Quality Control Reports*<br>Part 3.02 Surveys and Survey Control Submittals<br>1. Hydrographic Survey Equipment Specifications<br>2. Survey Control Procedures<br>3. All Drawings, Field Notes, and Quantity Calculations<br>Part 3.03 Sediment Verification - Sampling Reports |
| **Project Closeout - Section 01700** | Part 3.02 Pre-Final Punch List<br>Part 3.03 Final Documents<br>1. As-Built Drawings<br>2. Certificates |
| **DIVISION 2: SITE WORK** | |
| **Demolition - Section 02050** | Part 3.02 Demolition Plan<br>Part 3.03 Treated Timber Disposal Plan |
| **Capping - Section 02215** | Part 2.02 Borrow Source Characterization<br>1. Source Identification<br>2. Material Sample for each Source<br>3. Import Material Characterization Test Report<br>4. Import Material Characterization FSP/QAPP (if needed)<br>Part 3.01 Daily Capping Report<br><br>Part 3.01 Shipping Receipts and Material Volumes for all Import Materials |

## Table 2 - List of Submittals for Contractors



| *Construction Element* [a] | *Submittal* |
|---|---|
| **Temporary Water Pollution/Erosion Control** | Part 3.01. Temporary Water Pollution/Erosion Control |
| **Piling - Section 02360** | Part 1.07 Coating System<br>Part 2.01 Mill Certificates for Steel Sheet Piling<br>Part 2.01 Order Length for Steel Sheet Piling<br>Part 3.02 List of Pile Driving Equipment and Procedures |
| **DIVISION 3: CONCRETE** | |
| **Concrete Reinforcement - Section 03200** | Part 3.02 Order Lists and Bending Diagrams for Reinforcement<br>Part 2.01 Mil Certificates<br>Part 3.02 Shop Drawings |
| **Cast-in-Place Concrete - Section 03300** | Part 2.01 Manufacturer's Name and Specifications of Concrete Materials<br>Part 2.04 Certifications of Specification Compliance<br>*Part 2.04 Proposed Concrete Design Mix*<br>Part 2.04 Test Certificates for Concrete Properties |
| **Grouted Slope Mats - Section 03371** | Part 1.04 Installer's Qualifications<br>Part 2.01 Manufacturer's Name and Specifications of Materials<br>Part 2.05 Certification of Specification Compliance<br>*Part 2.05 Proposed Grout Design Mix*<br>Part 2.05 Test Certificates for Grout Properties |
| **DIVISION 13: SPECIAL CONSTRUCTION** | |
| **Settlement Monitoring - Section 13300** | Part 3.01 **Settlement Monitoring Plan**<br>Part 3.02 Results of Settlement Monitoring |

**Note:**

a. This table summarizes those divisions of the Final Design Specifications that are most relevant to the CQAP;

b. The Remedial Action Work Plan shall contain the Contractor's Project Work Plan, HASP, Environmental Protection Plan, CQC Plan, Settlement Monitoring Plan, and Project Schedule.

Additional submittals associated with other ancillary construction activities may be required.

**Bold** = Pre-construction Submittals

*Italics* = Construction Reports, as discussed in this CQAP

## Table 3A – Class B Water Quality Compliance Criteria

| Parameter | Water Quality Standard[a] |
|---|---|
| Temperature | <19°C and<br>No incremental increase > t =16/(T)°C above background[b] |
| Dissolved Oxygen (D.O.) | >5.0 mg/L at Mixing Zone boundary;<br>>3.0 mg/L at "Early Warning" boundary |
| Turbidity | If background <= 50 NTU[b] : <10 NTU above background<br><br>If background > 50 NTU[b] : <20 % increase above background |
| TSS | For Informational Purposes (No Criteria Available) |

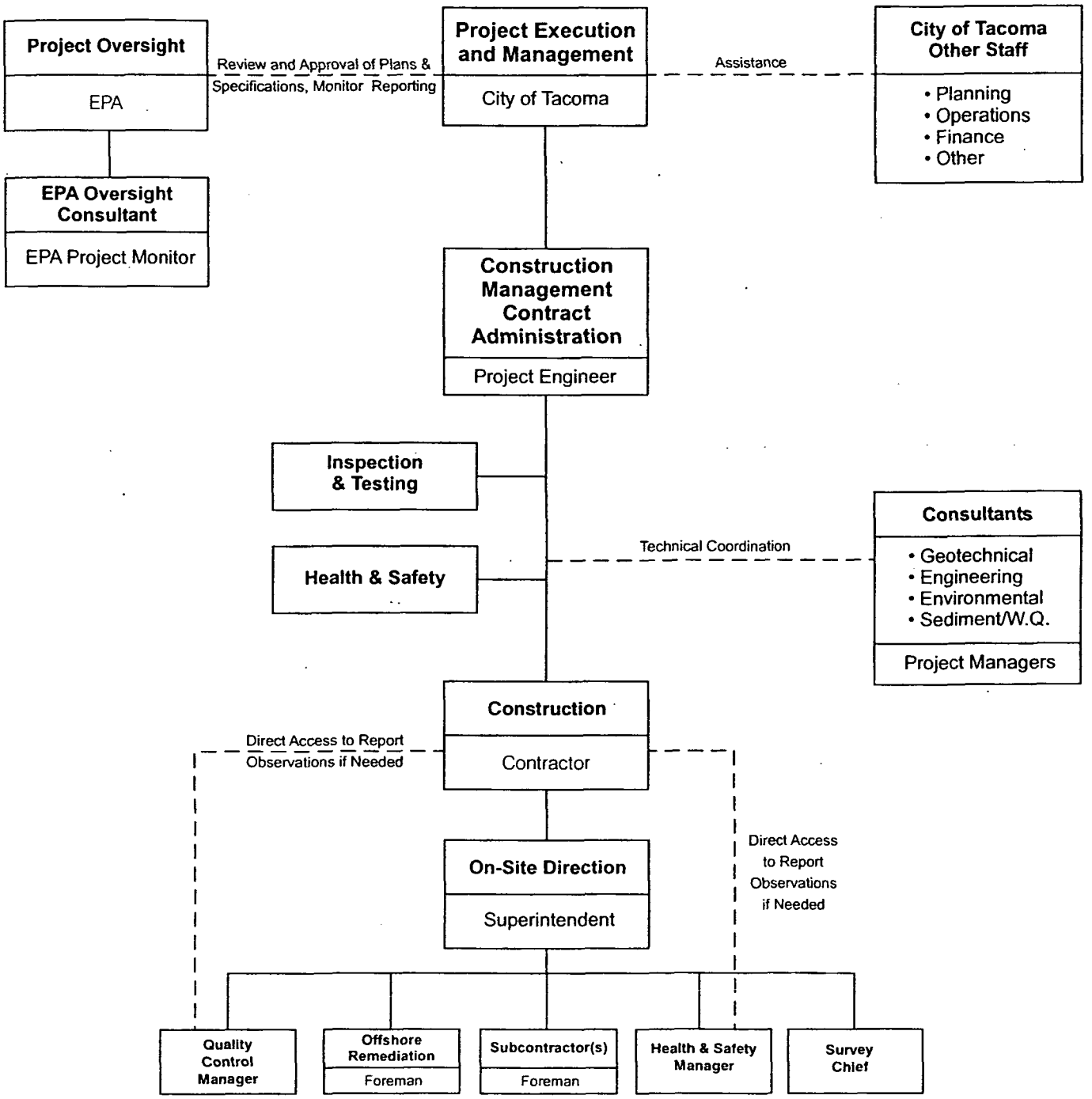
## Table 3B – Class C Water Quality Compliance Criteria

| Parameter | Water Quality Standard[a] |
|---|---|
| Temperature | <22°C and<br>No incremental increase > t =20/(T+2)°C above background[b] |
| Dissolved Oxygen (D.O.) | >4.0 mg/L at Mixing Zone boundary;<br>>3.0 mg/L at "Early Warning" boundary |
| Turbidity | If background <= 50 NTU[b] : <10 NTU above background<br><br>If background > 50 NTU[b] : <20 % increase above background |
| TSS | For Informational Purposes (No Criteria Available) |

Notes:
[a] Evaluated at compliance boundary 300 feet from point of construction, unless otherwise specified.
[b] Background temperature and turbidity to be defined as the 90th percentile condition in a pre-construction survey of ambient water quality, and as updated during construction.
t = Maximum permissible temperature increase above background.
T = Background temperature at point(s) unaffected by construction activities.

# Organization Chart

## Thea Foss and Wheeler-Osgood Waterways Remediation
## 2002 Construction




– – – – Support Role

CAS 407269AA.cdr 10/9/02

HARTCROWSER

*4072-69* *10/02*

*Figure 1* *CQAP*

**FIGURE 2**

**THEA FOSS AND WHEELER-OSGOOD WATERWAYS REMEDIATION**
**2002 CONSTRUCTION PROJECT**
**QUALITY ASSURANCE REPORT**

Period Covered: _____

Description of Work Inspected: _____

Results of Inspection (Including Any Out-of-Specs Conditions):

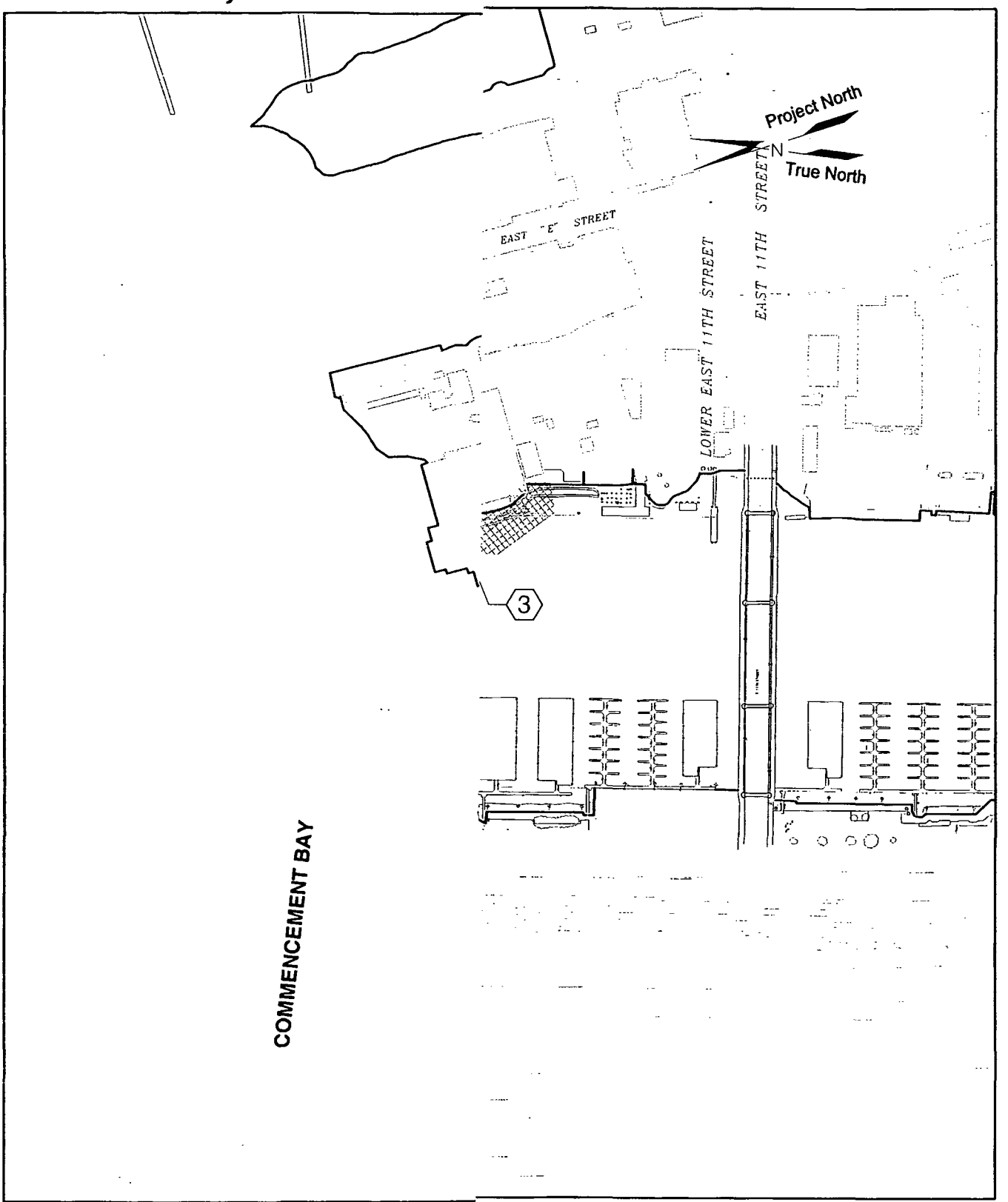
Test Results (Including Any Out-of-Spec Conditions):

Instructions to Contractor and Corrective Action Taken:

SUBMITTED BY: _____

TITLE: _____ DATE: _____

# Cap Verification Sampling Plan
## City of Tacoma
## Thea Foss Waterway




407269002.DWG DNK 10/9/02 1"=300'

**Note:** Base map prepared from drawings provided by Berger/Abam E

***Legend:***

- Cap Verification Sample and Core
- Cap Boundary Verification Sample

600

et

HARTCROWSER

*4072-69* *10/02*

*Figure 3* *CQAP*

# APPENDIX A
# SEDIMENT SAMPLING OPERATIONS MANUAL
# THEA FOSS AND WHEELER-OSGOOD WATERWAYS REMEDIATION
# 2002 CONSTRUCTION PROJECT

# APPENDIX A
# SEDIMENT SAMPLING OPERATIONS MANUAL
# THEA FOSS AND WHEELER-OSGOOD WATERWAYS REMEDIATION
# 2002 CONSTRUCTION PROJECT

## *A.1 Introduction*

Following completion of the remedial action, sediment quality will be monitored in those areas of the Thea Foss and Wheeler-Osgood Waterways that have been remediated through capping. The objectives of this confirmation program are to confirm the physical and chemical integrity of the cap (i.e., it has not been eroded or breached by migrating contaminants) and to verify that the surface sediments within the remediated areas have not been recontaminated by ongoing sources above the Sediment Quality Objectives (SQOs) established in the Record of Decision (EPA 1989). Sampling methods include: (1) collection of surface sediment samples to assess recontamination using a van Veen grab sampler, and (2) collection of subsurface sediment cores to assess cap integrity using a vibracore (or impact core). Proposed sampling locations for these monitoring events are shown on the Plans.

This manual is organized in three general sections: ***Preparation for Sampling, Sediment Sampling Procedures***, and ***Post-Sampling Procedures***. Attachment A-1 presents the Quality Assurance Project Plan (QAPP) for this sediment monitoring program. The HSP will be developed prior to sampling activities. A copy of this Sediment Sampling Operations Manual, and the HSP, should be available in the field when performing sediment sampling activities.

## *A.2 Preparation for Sampling*

### A.2.1 Review This Manual

Before conducting field work, all personnel must become familiar with this Sediment Sampling Operations Manual, as well as the HSP requirements. A number of issues need to be addressed and planned before field work can begin. If questions arise, ask the Project Proponents' Project Manager.

### A.2.2 Contact Appropriate People for Site Access

Begin contacting individuals at least one month in advance of sampling. Notify the Project Proponents' Project Manager (or their designee) of sampling schedule and clarify the following issues:

- Ship and berth space schedule (proposed sampling dates may need to be changed depending on this access);
- Availability of dock space for sampling vessel;
- Installation of the tide gage;
- Other potential restrictions; and
- Where vehicles should be parked during field activities.

### A.2.3 Contact Analytical Laboratory

It is recommended that a Laboratory Services Work Order be completed for each sediment sampling event. As an attachment to the Work Order, analytical methods, sample quantitation limits, and quality control requirements for each analysis should be specified (include a separate copy of the QAPP to the lab). Any deviations from these requirements by the laboratory will have to be approved beforehand by the Project Proponents or their designee (Consultant).

At least one week before the sampling event, the laboratory should be notified and the following should be discussed with the Laboratory Project Manager:

- Date of sampling, number of samples to be collected, and date of sample delivery to laboratory;
- Analyses to be performed, including required detection limits and laboratory QA/QC;
- Number and type of jars needed and time of bottle delivery;
- Date results are needed;
- Sample disposal; and
- Other work order issues.

Upon receiving jars from the lab, verify that all necessary containers are present. Review which jars are required for which analyses and minimum required sample volumes. Label containers and organize them into coolers. Prepare necessary ice packs and bubble wrap for jar protection and sample preservation.

### A.2.4 Contact Subcontractors

Planned field work must be coordinated with the sampling vessel owner/ operator, and the location control specialists, if necessary. The following should be discussed:

- Availability and duration;
- Number of personnel needed for operation and how many personnel can be onboard at one time;
- Set up time required (travel, shipping, software, maps); and
- Other work order issues.

### A.2.5 Organize Field Supplies

Start organizing field equipment and supplies at least one week in advance of established sampling date. Ensure that all equipment and supplies are in good working order, and calibrated if necessary.

### A.2.6 Install Tide Gages

Sediment sampling cannot begin until tide gages have been installed at the site. Be sure that they are correctly in place at least one day before the field work begins. The Contractor will specify the methods and equipment used for installation of a tide gage in the Contractor's Field Sampling Plan (FSP).

### A.2.7 Set Up GPS Control Location

Establish a GPS control location on land. This control point should be readily accessible for the duration of the sampling project. The GPS should be checked at a location with known coordinates beforehand to ensure that the unit is operating within the required level of accuracy (i.e., real-time differential correction is operating). The Contractor will specify the methods and equipment used for horizontal positioning in the Contractor's Field Sampling Plan.

## *A.3 Sediment Sampling Procedures*

This section describes the procedures to be used for the sediment quality monitoring included under this CQAP.

### A.3.1 General Approach

Surface sediment samples will be collected for chemical analyses as detailed in Section A-1.4 of Attachment A-1. A van Veen sampler will be used to collect the sediment samples. Subsurface samples may also be collected using vibratory or impact coring methods. These methods are discussed in detail in Section A.3.3. In addition to the monitoring samples, field duplicate and rinseate blank samples will be collected at a frequency of one per twenty samples, and matrix spike/ matrix spike .duplicates will be collected at a frequency of one per sample group or twenty samples (see Section A-1.6 of Attachment A-1).

### A.3.2 Arrival at the Site

As equipment is being loaded aboard the vessel, stow sampling and storage equipment in appropriate areas. Check the GPS to ensure it is properly functioning. Coordinates for the proposed sampling locations should be pre-entered into the location control software program for referencing.

Before leaving the dock, conduct a Health and Safety meeting to establish the work zone areas, to discuss potential contamination migration pathways and their preventions, to identify potential vessel hazards, and to establish the boat operator's specific health and safety guidelines. Be sure that personnel working at the site understand and sign the Contractor's Health and Safety Plan.

### A.3.3 Sediment Sampling

Sampling of surface sediment will be performed following completion of the Remedial Action to determine compliance with the SQOs and Sediment Remedial Action Levels (SRALs). Proposed sampling locations are shown on the plan drawings. The sediment sampling schedule, and decision framework for evaluating results, is presented in Section 3.0. Sampling procedures and handling protocols for these sediment sampling activities are described below.

**Sampling of Surface Sediment (van Veen Sampler).** Samples of surface sediment (0 to 2 and/or 0 to 10 cm depending upon the sampling location) will be collected in general accordance with Puget Sound protocols as outlined in the Puget Sound Estuary Program (PSEP; Tetra Tech 1986) and as specified

herein. If there are procedures or protocols specified below that conflict with PSEP, the statements of this document shall take precedence. Methods may be updated or revised as directed by EPA or the City. A stainless steel van Veen grab sampler will be used to collect surface sediment samples.

The general procedure for collecting van Veen surface sediment samples is as follows:

1. Make field notes and logbook entries as necessary (see Section A.3.6) throughout the sampling process to ensure thorough and accurate record keeping.

2. Maneuver the sampling vessel to the proposed sampling location as shown on Figure 2 of the OMMP, using the positioning procedures described in Section A.3.5.

3. Open the sampler and slide the locking pin into place.

4. Signal the winch operator to lift the sampler.

5. Guide the sampler overboard until it is clear of the vessel and remove the locking pin.

6. Lower the sampler through the water column to the bottom, on the sampling location at approximately 1 foot/second (fps).

7. Record the location and note the angle of the cable relative to the boat when sampler reaches bottom.

8. Signal the winch operator to begin retrieving the sampler and raise it at approximately 1 fps.

9. Guide the sampler on board the vessel and place it on the work table on the deck; use care to avoid jostling that might disturb the integrity of the sample.

10. Examine the sample for the following sediment acceptance criteria:

    - Sampler jaw is closed;

    - The sample does not contain foreign objects;

    - The sampler is not overfilled so that the sediment surface presses against the top of the sampler;

- No leakage has occurred, as indicated by overlying water on the sediment surface;
- No sample disturbance has occurred, as indicated by limited turbidity in the overlying water;
- No winnowing has occurred, as indicated by a relatively flat undisturbed surface; and
- A penetration depth of at least 11 cm has been achieved.

If sample acceptance criteria are not achieved, the sample will be rejected and the location resampled. If unable to obtain a sample that meets the appropriate acceptance criteria within 50 feet of the proposed location, the sample will be relocated as determined by the Project Manager or Task Manager, as appropriate.

11. Siphon off any standing water from the surface of the sediment using a hose primed with site water. Care should be taken to not disturb the integrity of the sediment surface.

12. Visually classify sediment in accordance with ASTM D 2488 methods and the Unified Soil Classification System and record on a sampling form.

    In addition to the visual classification, qualitative descriptive parameters, including biota, debris, sheen, etc., will be recorded on a sampling form.

13. Depending upon the sampling location collect either the upper 2 cm or the upper 10 cm of sediment from the sampler using a stainless steel implement. Take care not to include any material that has been in contact with any interior sampler surface. Place sediment into an appropriate-sized stainless steel homogenization bowl.

14. Thoroughly rinse the interior of the sampler until all loose sediment has been washed off. Excess sediment will be returned to the subsurface sample location to prevent disturbance to other sampling locations.

15. Repeat the sampling process (if necessary) until sufficient volume is obtained to satisfy the sampling requirements for each location. Collect successive grab samples within a radius of 10 feet of the initial sampling location. Successive grab samples will be recovered until sufficient volume is obtained.

16. Homogenize the bulk sediment until the sediment appears uniform in color and texture.

17. Distribute the homogenized sediment to appropriate sample containers identified in Table A-1-2 and ensure that sample labels are completely filled out and affixed to the containers.

18. Clean the exterior of all sample containers and store them in a cooled ice chest away from the immediate work area aboard the boat. The cooled ice chest will be maintained at 4 degrees Celsius.

19. Thoroughly decontaminate the sampler by following the procedure in Section A.3.4.

20. Ensure that sediment descriptions and supporting logbook entries are complete.

21. Proceed to the next proposed sampling location.

**Subsurface Sediment Sampling (Vibratory or Impact Coring).** Subsurface sediment sampling will be conducted to evaluate cap integrity. Subsurface sampling will be accomplished using a vibracore or impact corer. The Contractor will provide coring methods and equipment used as part of the Contractor's Field Sampling Plan.

The general procedure for collecting core samples is:

1. Make field notes and logbook entries as necessary (see Section B.3.6) before and after the sampling process to ensure thorough and accurate record keeping.

2. Position the vessel or work platform over the proposed sample location following the station location procedures outlined in Section B.3.5.

3. A 5-foot-long core tube (minimum length) will be secured to the head assembly and deployed from the vessel.

4. The cable umbilical to the A-frame and core assembly will be drawn in taut and perpendicular, as the core tube rests on the mudline.

5. Location of the umbilical hoist will be measured and recorded; the depth to the mudline will be measured with a survey tape attached to the head assembly.

6. The core tube will be vibrated or driven into the sediment.

7. A continuous core sample will be collected to 5 feet depth or until refusal.

8. The depth of core penetration will be measured and recorded.

9. The core barrel will be extracted from the sediment using the hydraulic winch.

10. While suspended, the assembly and core barrel will be sprayed off with site water, and then placed on the vessel deck.

11. The core sample will be evaluated at the visible ends of the core tube to ensure that the retrieved sediment core reached the required penetration depth. Sample recovery will be inspected relative to the following acceptance criteria:

    - Overlying water is present and the surface is intact;
    - Calculated compaction is not greater than 25 percent; and
    - The core tube appears intact without obstructions or blocking.

12. Record descriptions on the field log sheet.

13. Split the core into subsamples as specified in the OMMP, segregate, and homogenize the subsamples from the core.

14. Distribute the homogenized sediment to appropriate sample containers identified in Table A-1-2 and ensure that sample labels are completely filled out and affixed to the containers.

15. Clean the exterior of all sample containers and store them in a cooled ice chest away from the immediate work area aboard the boat.

16. Thoroughly decontaminate the sampler by following the procedure in Section A.3.4.

17. Ensure that sediment descriptions and supporting logbook entries are complete. Qualified scientists with core logging experience will be used.

18. Once coring is complete, proceed to the next proposed sampling location and repeat the above procedure. Completely decontaminate all sampling equipment before advancing next core.

Refer to Section A.3.8 for further details on proper sample handling.

### A.3.4 Field Equipment Decontamination

Decontamination is necessary for equipment which contacts any sample to be used for chemical testing. The decontamination procedure will include a phosphate-free detergent wash and successive rinses between all sampling locations. No solvents or acid washes will be used because of safety, rinseate disposal, and sample integrity considerations.

This decontamination procedure, based on PSEP protocols (Tetra Tech, 1986), is designed to prevent cross-contamination between sample locations, contamination from the field crew, or contamination from the equipment. Equipment for reuse will be decontaminated between sample locations aboard the vessel according to the procedure below before each use:

- Seawater will be sprayed over equipment to dislodge and remove any remaining sediments from previous sample location;
- Surfaces of equipment contacting sample material will be scrubbed with brushes using an Alconox solution;
- Scrubbed equipment will be rinsed and scrubbed with clean tap water; and
- Equipment will undergo a final spray rinse of deionized water to remove tap water impurities.

This process will be repeated prior to sampling at the sample location.

### A.3.5 Location Control and Documentation

This section summarizes the methods of location control utilized for the sampling activities. The objective of the sampling location positioning procedure is to accurately (±3 feet) determine and record the positions of sampling locations. The Plans display the proposed sampling locations. This determination will be achieved by referencing each sampling location to known survey control points using appropriate field survey methods described below.

The following parameters will be documented at each sampling location:

- Location coordinates;

- Vertical elevation in feet (including mudline and tidal elevation above mudline);

- Time and date; and

- Tidal elevation referenced to Mean Lower Low Water (MLLW).

These parameters will be measured using combinations of differential global positioning, pre-surveyed visual horizontal triangulation to survey control points, and/or permanent structures on base maps and aerial photographs, and weighted tape measures.

**Differential Global Positioning System.** For this study, location control will be performed using Differential Global Positioning System (DGPS) unit. The DGPS unit onboard the vessel will receive radio broadcasts of DGPS signals from satellites. DGPS coordinates for each sampling location will be recorded at the time of sampling.

**Visual Horizontal Triangulation Methods.** As a backup method, visual horizontal triangulation using pre-surveyed markers and/or existing structures will be used. Horizontal triangulation methods involve the identification (survey) of proposed sampling locations and confirmation of actual sampling locations based on horizontal distances to survey control points and/or permanent structures identifiable on base maps. Sampling locations will be identified by triangulation using readily identifiable points and/or measuring the horizontal distance from the actual sampling location to a known survey control point and/or permanent structure to the nearest foot using an incremented tape measure. These horizontal measurements can be determined from the base maps prior to sediment sampling to identify proposed sampling locations or used to determine the actual sampling location on the base map and translated to state plane coordinates. A buoy marker may be deployed to mark the sampling location and aid in positioning the vessel for sampling. Vertical elevations will be determined for all locations, as discussed below.

**Vertical Control.** The vertical control parameters measured are depth to sediment (mudline) and tidal elevation. The depth to sediment is measured before and after each sampling event using a hand-held weighted tape. The incremented weighted tape is dropped to the bottom off the work platform, pulled taut, and read to the nearest 0.1 foot. The depth will be corrected for the length of the attached weight. This observation will be cross-checked against the onboard depth sounder, which will record the depth from the water surface to the mudline.

Tidal readings will be taken from the tide gages. Tide elevations and time are monitored and recorded before each sample is collected to the nearest 0.5 foot. Sample elevations will be corrected to MLLW.

### A.3.6 Sediment Quality Sample Handling

Field personnel will log each sample and package samples for transport.

**Sample Logging in the Field.** Samples will be inspected for signs of excessive disturbance and appropriate recovery. After samples are deemed acceptable, the following information will be recorded on the field log sheet:

- Date, time, and name of person logging sample;
- Sample location number;
- Depth of water at the location;
- Sediment sample depth;
- Sample recovery; and
- Sample description.

**Sample Packaging in the Field.** Samples will be homogenized in a stainless steel bowl and placed in appropriate containers supplied by the laboratory. The sample containers are then sealed and placed on ice in a cooler. Sediment samples are transported to analytical laboratory at the end of the sampling day.

## *A.4 Post-Sampling Procedures*

### A.4.1 Chain of Custody

This section provides guidance on labeling and custody of samples.

#### *A.4.1.1 Sample Labeling*

Sample labels will clearly indicate sampling locations, sample number, the project name, sampler's initials, analysis to be performed, date, and time. Labels will be filled out prior to sampling and affixed to the sample jars.

#### *A.4.1.2 Sample Custody*

**Definition of Custody.** After recovery, samples will be maintained in custody until formally transferred to laboratory. For purposes of this work, custody will be defined as follows:

- In plain view of the field representatives;
- Inside a cooler which is in plain view of the field representative; or
- Inside any locked space such as a cooler, locker, car, or truck to which the field representative has the only immediately available key(s).

**Custody Records.** A chain of custody record will be initiated at the time of sampling for each sample collected. This record will be signed by the field representative and others who subsequently hold custody of the sample. A copy of the chain of custody with all the appropriate signatures will be returned to the project manager.

### A.4.2 Shipping Requirements and Receipt

Prior to shipping, sample containers will be appropriately packed and secured inside a cooler with ice packs. The original signed custody forms will be transported with the cooler. The cooler will be secured and appropriately labeled for shipping and handling. Samples will be delivered to the laboratory under custody control protocols following completion of sampling activities.

## *A.5 References for Appendix A*

EPA 1989. Commencement Bay Nearshore/Tideflats Record of Decision, U.S. Environmental Protection Agency, Region 10, September 1989.

Tetra Tech Inc. 1986 (as updated through 1996). Recommended Protocols for Measuring Selected Environmental Variables in Puget Sound. Puget Sound Estuary Program.

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# ATTACHMENT A-1
# QUALITY ASSURANCE PROJECT PLAN
# FOR SEDIMENT QUALITY ANALYSIS CHEMISTRY
# THEA FOSS AND WHEELER-OSGOOD WATERWAYS REMEDIATION
# 2002 CONSTRUCTION PROJECT